APRIL 28, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

STEEL EXPANSION
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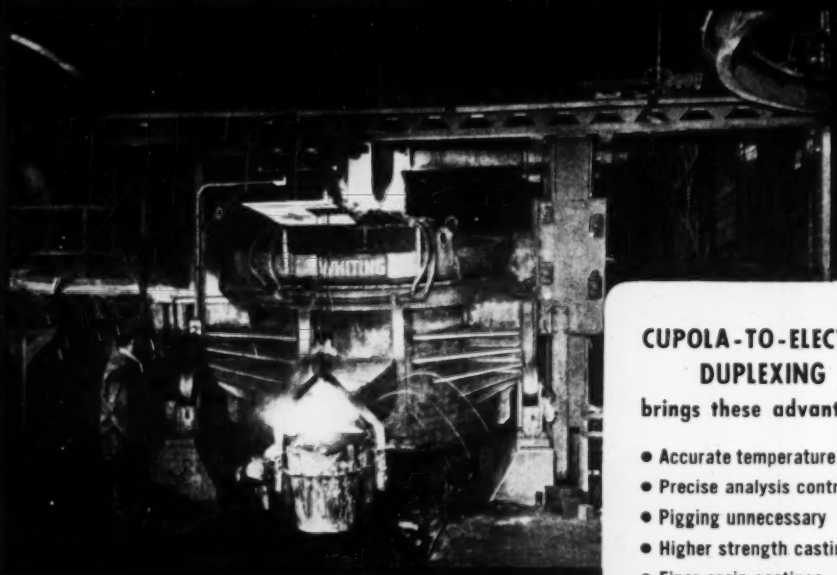

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This Week in Metalworking

STEEL

Vol. 130 No. 17 April 28, 1952

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Editorial, Business Staffs—10. Advertising Index—174. Editorial Index available semi-annually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

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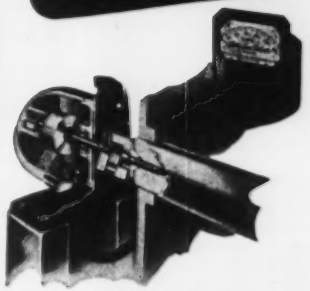

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Behind the Scenes...

To Press

We went upstairs a while back to see the editors put the book to bed. Various parts of the magazine go to press every day in the week, but the news pages go last and we arrived about one hour before they were due for their final o.k.

Five men have a part in the final checking. Three of them were seated at two back-to-back desks in the center of the news room. Bob Jaynes, Floyd Lawrence and John Kelsey were bending over tissue-thin sheets of paper. Each was a proof of one of the 12 pages that go last. The tissue proofs come up in a pneumatic tube from the printing department down below. All read each page.

One page that we followed around was read first by John Kelsey. He found one typographical error and two heads on small stories that had been transposed. Floyd Lawrence questioned a statement that the United Auto Workers was the largest union in the country. He went back to the library and found that the fact was correct. Bob Jaynes was the third man to read the tissue and indicated on it that the printers should leave more white space between the head and deck of the first story on the page. Bob also checked the page against the dummy which had been pasted up earlier for the printers' guidance. One story had been cut back three lines on the dummy so it would fit, and he checked to find that the change had been made.

"This one better go back down," he said to no one in particular. It was the first time anyone had said anything since we arrived. Normally the hubbub in the news room is considerable, but things quiet down as the zero hour approaches.

The page went down the tube and Bob turned his attention to another flimsy. Floyd and John were already at work on others. One had a blank space on it.

"What goes in the hole on 67?" Floyd called out.

"That labor chart," came a voice from one of the many offices along one side of the news room. Ed Birkner was speaking. He's in charge of charts, tables, pictures and the general appearance of each issue. "It's due from the engravers at quarter to five," he said.

The reading continued. In about ten minutes the first page came back in the tube. John Kelsey checked it, marked his o.k. in the upper right corner, then took it into Ed Birkner who checked a table and looked to see that the picture was not upside down (on a smudgy proof the picture can be indistinct and the error could slip by). Next the page went to Art Zimmerman who does the final reading.

In a while, Editor Irwin Such came along. "Can we make it?" he asked Art. (The previous week the printing department complained when the editors missed the deadline.)

"We're in good shape," said Art.

That surprised us because non-approved pages were scattered all over his desk, two with blank holes in them, and it looked to us like it would take two days to straighten out the confusion. But in the next half hour, cuts arrived, the o.k.'d pages piled up. At five past five—ten minutes before the deadline—Art stuck his head out his office door.

"We're o.k.," he called. Somebody whistled in one of the offices. Floyd held up clasped hands in the prize fighter's gesture of victory. Just then Associate Editors Vance Bell and John Morgan came in with some of the assignments for the next week's issue.

Puzzle Corner

The people in the problem of Apr. 14 saw a polar bear—hence, a white one—because they had to be at the North Pole to have traveled such distances. First in with that answer were Carl T. Crawford Jr. of Gillett & Eaton Inc., Evvonne A. Cochran of Ohio State University, T. S. Bean of Barber & Ross Co., George W. Frederick of Republic Steel Corp., and Harry Rupp of Service Iron & Steel Co.

Here's a problem sent in by Lt. Comdr. F. M. Nelson: A ship is twice as old as its engine was when the ship was as old as its engine is now. If the sum of the present ages of the ship and its engine is 42 years, what are the present ages of each?

Shrdlu

(Metalworking Outlook—Page 37)

ight there in the clutch...

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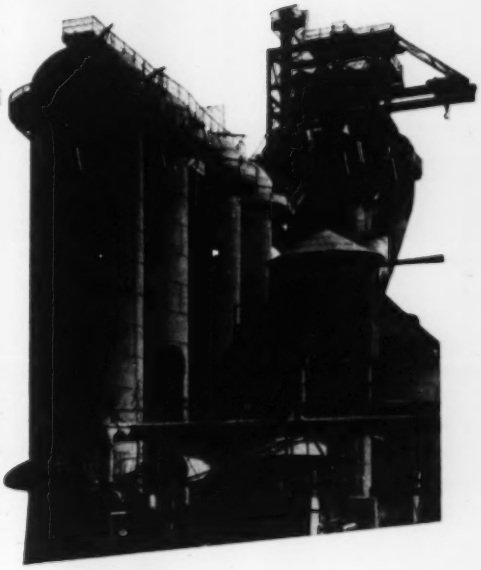

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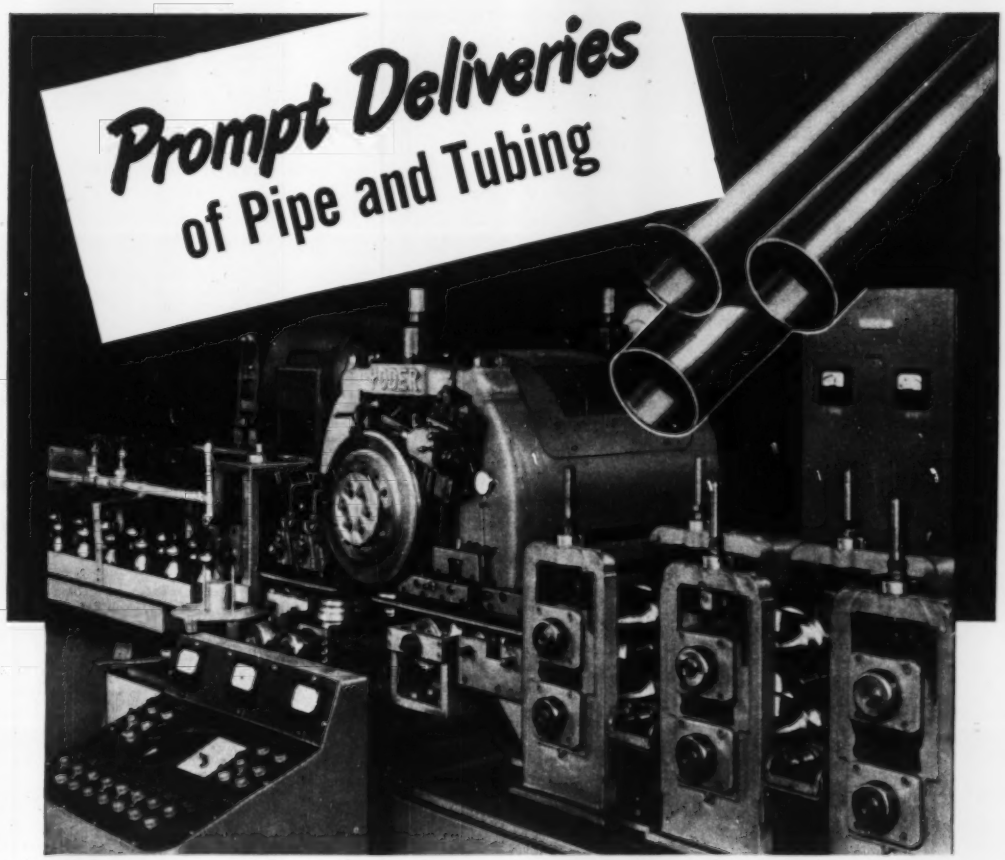

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LETTERS
TO THE EDITORS

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There seems to be Marshall Aid money for dolling up any old broken-down community in the world, but no money, after living with our rivers, for instance, for 160 years, to prevent this quarter's record-breaking floods.

M. R. Daugherty
Los Angeles

Courage Is Called For

Congratulations on your editorial "Step by Step to Ruin."

It is an encouraging sign of the times that magazines, like STEEL, are taking a courageous stand on matters of vital importance to our economy that we have been slipping on.

Rene D. Wasserman, president
Eutectic Welding Alloys Corp.
New York

Congratulations on your editorial "Rotten Apples" (Mar. 17, p. 51). Excellent and timely.

R. S. Archer
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We would like permission to reprint "Nickel Shortage Shifts Focus to Type 430 Stainless" as it appeared in STEEL, (Aug. 20, p. 66).

J. W. Andersen
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Chicago

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Who and Where Department

The article "Cutting Wind Slices Thin" (Mar. 3, p. 75) is of considerable interest to me.

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C. W. Cline, research metallurgist
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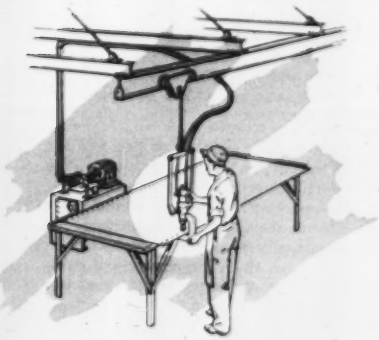

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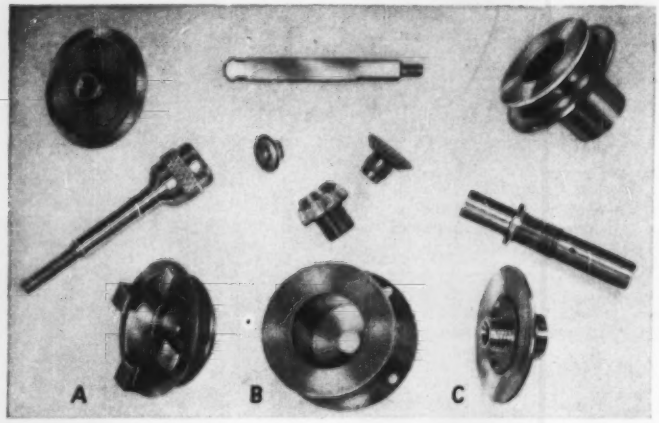


A group of screw machine products. The operations for making items A, B and C, are described in the text. Courtesy New Haven Screw Machine Products, Milford, Connecticut.

Short Runs, Yet Precision Quality

Screw machine manufacturers are often called upon to supply a few hundred pieces of an item, some of which are quite complicated and sometimes very close in tolerance specifications.

Automatic screw machines are designed for production runs. The planning, special tool designing and preparation are the same for either long or short runs. For short runs, you've got to be right the first time as there is very little allowance for experimental work or errors in judgment since a few hundred pieces can absorb only a limited amount of such costs. Hence, the successful and profitable handling of difficult jobs made in short runs calls for an extremely high degree of engineering know-how and just plain ingenuity.

Of course, once developed and set up, reruns can be made with very little effort. However, the greatest benefit the operator receives from doing these difficult short-run jobs comes from the opportunity of doing normal work in long runs, since the buyers will naturally favor the supplier who goes out of his way to help him.

The following items were made on a short-run basis:

A–Pressure Head for Steam Trap

This is an unusual job and calls for clever planning.

1. Counterbore a $\frac{7}{8}$ diameter hole, which must be kept to a tolerance of plus 0.005" and minus 0.
2. Drill center.
3. Recess. The undercut is made with a swing tool.
4. Tap center hole.
5. Forming is done during counterboring.

The lugs are made by secondary milling operations. First, the cutter removes the material on both sides of the pair of lugs opposite each other, then the work is indexed 90° and material on both sides of the other two lugs is removed. A third and fourth milling operation cleans up between the lugs.

Bridgeport commercial bronze rod No. 89, $1\frac{1}{2}$" diameter, was used. Composition 89.5% copper, 2% lead, and balance zinc. Machinability rating 80% of free-cutting brass rod (rated at 100%). Rich bronze color and a higher corrosion resistance than yellow brass.

B–Extension for Bellows Used in Thermostats

This reel-shaped item requires the removal of a considerable amount of material both inside and outside.

1. Center.
2. Drill large hole.
3. Drill small hole in center of base.
4. Center bore to square up inside base of large hole.
5. Forming tool cuts away excess stock for outside shape.
6. Four holes on larger rim are drilled as a secondary operation.

Since stock removal is exceptionally high, it was made from 1-9/16" Bridgeport Ledrite 6 brass rod (61% copper, 3.4% lead, balance zinc). Machinability rating 100%.

C–Part for Steam Trap

This item calls for a flange 0.046" thick with a tolerance of plus or minus 0.002" for both the thickness and outside diameter. Another important requirement is that the flange must be straight and flat.

1. Center and dwell.
2. Rough form.
3. Undercut.
4. Drill hole.
5. Taper, ream and finish form.
6. Thread.

Bridgeport's medium leaded Naval brass rod, alloy 28 (60% copper, 0.6% lead, 0.65% tin and remainder zinc). Machinability rating 50%. The 0.6% lead has raised the machinability appreciably since Naval brass without lead has a machinability rating of about 30%.

Many Alloys Available

Bridgeport makes a wide range of alloys for screw machine operation. Composition, physical and mechanical properties, machinability rating, corresponding specification numbers, etc., are tabulated in the Bridgeport "Technical Handbook." This booklet is especially valuable for companies making items which require alloys to meet various specifications. If you do not have a copy of this valuable booklet, write for one on your company stationery. (8236)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

DEZINCIFICATION CORROSION (Cont'd)

In common with many other types of corrosion and chemical reactions, an increase in temperature increases the rate of dezincification in the brasses susceptible to this type of corrosion.

The following curves clearly show the effect of temperature on the rate of corrosion (dezincification) of Muntz metal (copper 60.2%, zinc 39.7%, balance traces of lead, etc.) and naval brass (copper 60.8%, zinc 38.4%, tin 0.73%) in 2N sodium chloride solution (approx. 10% NaCl, when hot pH is approximately 8.5-9.0). Included for comparison is red brass (copper 84.8%, zinc 15.2%) which shows very slight or no tendency towards dezincification.

Test Conditions

A water-line test was used since the supply of oxygen at the water line tends to intensify the corrosive action in a comparatively narrow band. This generally gives an indication of what the maximum rate of corrosion is in this environment. The depth of dezincification or corrosion was calculated from the loss in tensile strength found in ⅜" diameter rods exposed for 249 days. Visual and metallographic examination of the broken tensile specimens (particularly those tested at 80°C) showed that deep uniform layer-type dezincification had occurred immediately below the water line, which had been automatically maintained throughout the test period.

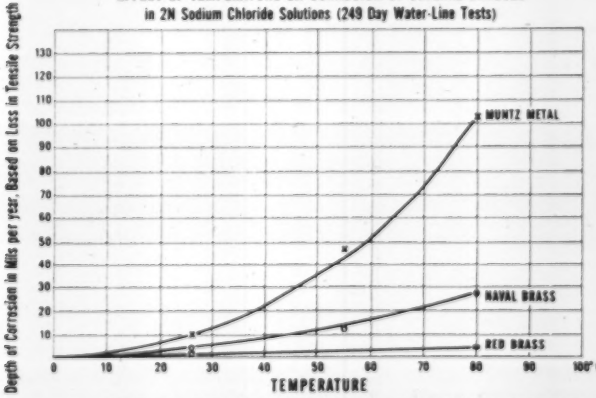
Temperature Rise Accelerates Dezincification

The rate of dezincification increases approximately 6 times and 11 times respectively for naval brass and Muntz metal when the temperature is increased from 27°C to 80°C. Service data regarding dezincification in non-scale-forming waters and brine solutions are in agreement with these laboratory data as regards the increased rate and tendency towards dezincification at the higher temperatures. The red brass shows approximately two-fold increase in corrosion rate over the same temperature range.

It should also be noted that the naval brass, which contains 0.73% tin, had a rate of dezincification about one-third that of Muntz metal. This explains in terms of corrosion rates the preference for naval brass where increased resistance to dezincification is needed.

At lower temperatures the rate of dezincification is low and explains the long life obtained from naval brass and Muntz metal piping, tubing, plates, sheets, etc., used in contact with cooling brines. However, where the maximum resistance to dezincification is needed, copper, red brass and other high-copper alloys are preferred.

EFFECT OF TEMPERATURE ON CORROSION OF SEVERAL BRASSES
in 2N Sodium Chloride Solutions (249 Day Water-Line Tests)



NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Electronic Production Gage shows how far off-size work is on either side of zero on either of two continuous scales. Meter response is said to be instantaneous, without overshoot. Full scale readings are plus and minus 0.005 and 0.0005-in. or 0.002 and 0.0002-in. Work to height of 8½-in. above anvil can be accommodated. **No. 1222**

Foot-Operated Vise reportedly applies hydraulic pressures up to 7½ tons to grip work for assembly, production or maintenance. One pedal draws vise up to work, second applies and holds required pressure, third releases vise. It is said to speed up forming, punching, pressing, cutting and other operations. **No. 1223**

Universal Primer is said to adhere well to brass and hard-to-finish materials. This vinyl plastic-base primer can be applied by dipping or spraying, and air dries in fifteen minutes. Its reported flexibility allows parts to be formed, extruded or blanked after they are finished. **No. 1224**

Gear Hobbing Machine is equipped with differential and can cut spur, spiral and worm gears. Cutter head is said to be arranged for tangential feeding for generating multiple start worm gears without ridges on tooth flanks. Single or multiple worm gears can be made on production basis by placing worm blank on hob arbor and gear generator cutter on work arbor. Machine is said to produce gears of following maximum dimensions: spur, 20-in. diameter, 10-in. face, 5-diametric pitch; spiral, 30 deg. and 19 in., 45 deg. and 15 in., and 60 deg. and 14 in. **No. 1225**

Hydraulic Crane Scale has dial that weighs in both pound and kilogram units. Scale is offered in 5, 10 and 20-ton capacities and hangs directly on crane or hoist hook to weigh loads as they are handled. Optional tilt-face dial permits high-level reading. **No. 1226**

Surface Thermometer said to be suitable for application to any flat surface and to indicate temperature from the back of the instrument only. A highly reflective evaporated mirror reportedly insures the thermal element against any external radiation. Said to have an accuracy of plus or minus 2 deg. over entire range from 0 to 300 deg. F. it is sealed against corrosive atmospheres. Can be applied with magnetic clamp or with silicon grease. **No. 1227**

Ratchet Wrench with open end or in crowfoot type is said to ratchet nuts or fittings on or off standing centers speedily and easily. Wrench ratchets in 7½ deg. arc (5 deg. in larger sizes). Range of sockets is provided between 3.8 and 4 in. in 1/16 in. increments. Open ends said to accommodate up to 2¾ in. tube or pipe or 3 in. in crowfoot type. Adaptors permit driving of standard sockets, turnbuckles, plugs, Allen head set screws and other fasteners. **No. 1228**

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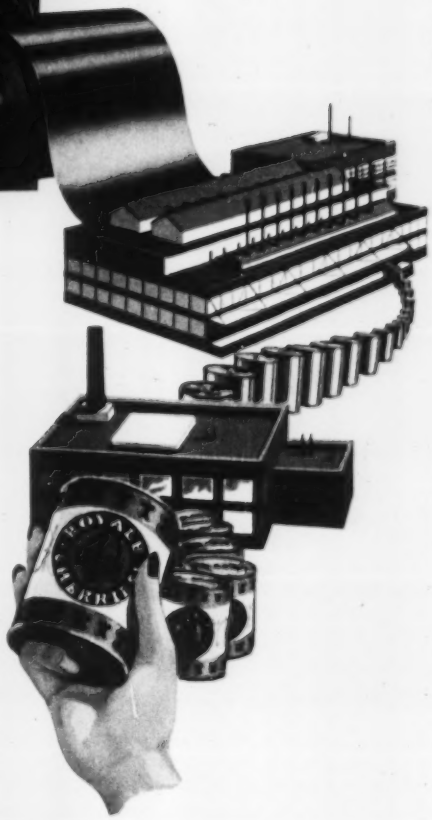

The canning industry—America's largest user of tinplate—depends largely upon progress in the development of new and better steel rolling and coating processes to broaden its ever growing usefulness to the public.

One step in the process of making better tinplate for canning is the giant new United mill shown in operation. Designs for this, and other mills with production speeds up to 5000 feet per minute, are available for duplication, or for revision to suit your requirements. UNITED's engineers will be glad to confer with you concerning your plans for increased tinplate production.

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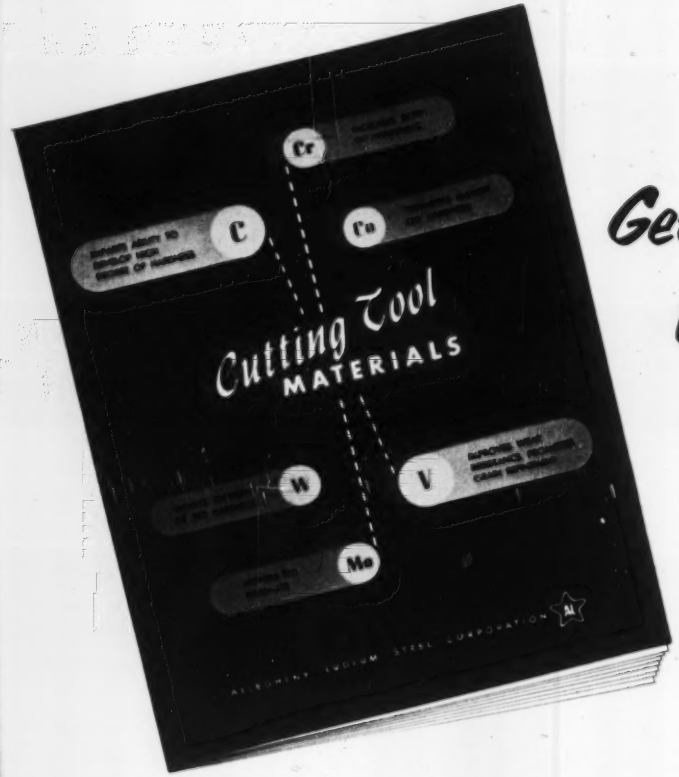

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This booklet in no way replaces, but does supplement, what you can learn by practical experience or what you can gain by calling in an A-L tool engineer. In compact form and quite impartially, the booklet presents the basic facts that enable you to speedily compare the suitability of various tool materials for specific uses. *Send today for your free copy.* There is no obligation involved.

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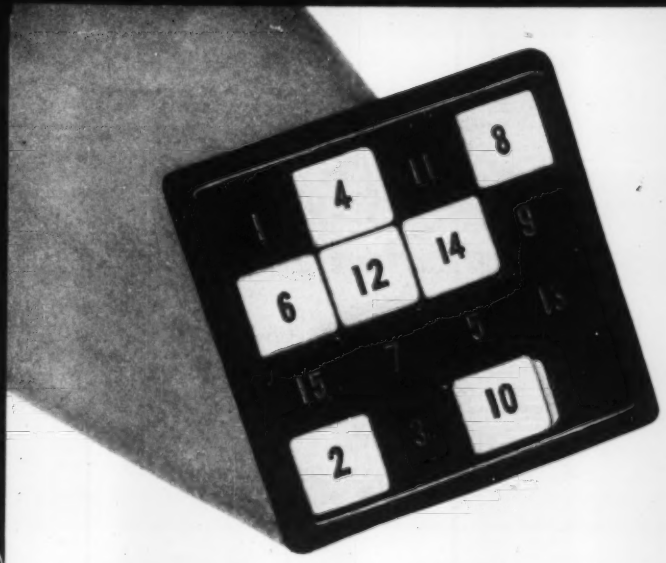

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Power Puzzle

Power in most manufacturing is a major charge against unit costs. With a continuing rise in labor and material costs, power becomes the one factor that presents a possibility for important savings.

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Listed here are a few of the ways Fairbanks-Morse Diesel power generation can help solve your problem. These are *proved* answers based on more than 50 years' experience in the power generation field.

If power has you puzzled, write us today, outlining your needs. Fairbanks-Morse engineering can help put your power costs and performance in order. Fairbanks, Morse & Co., Chicago 5, Illinois.

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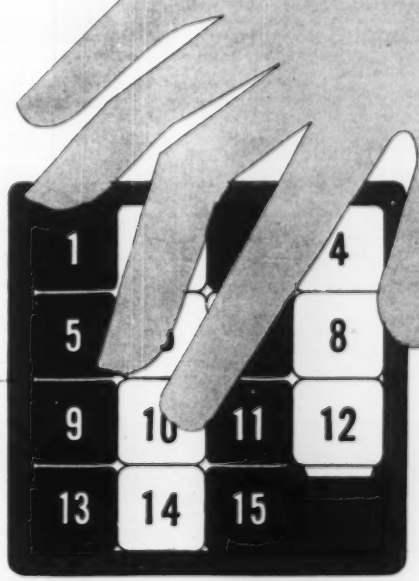


Put Your Power Costs and Performance in Order

1 ***Handle Peak Demand*** . . . reduce peak demand values for lower purchased power cost.

2 ***Raise Power Factor*** . . . "in-plant" generator can eliminate power factor penalties.

3 ***Emergency Power*** . . . insurance against lost production, damage due to line failures.

4 ***Handle Surge Loads*** . . . that may now be affecting current characteristics of entire plant.

5 ***Plant Expansion*** . . . need not be restricted due to lack—or expense—of ample power.

6 ***Useful Heat*** . . . lube oil, water and exhaust heat can cut drying and heating costs.

7 ***Chemical Value*** . . . exhaust gases are high in nitrogen—available for economical fixation of nitrates, ammonia.

8 ***Insurance Advantage*** . . . of diesel over gasoline engine, for example, will soon pay for installation.

9 ***No Weather Worries*** . . . ice, snow, sleet, wind storms can't stop plant operations.

10 ***Handle Increasing Load*** . . . "in-plant" power economically adds to current capacity as load increases.

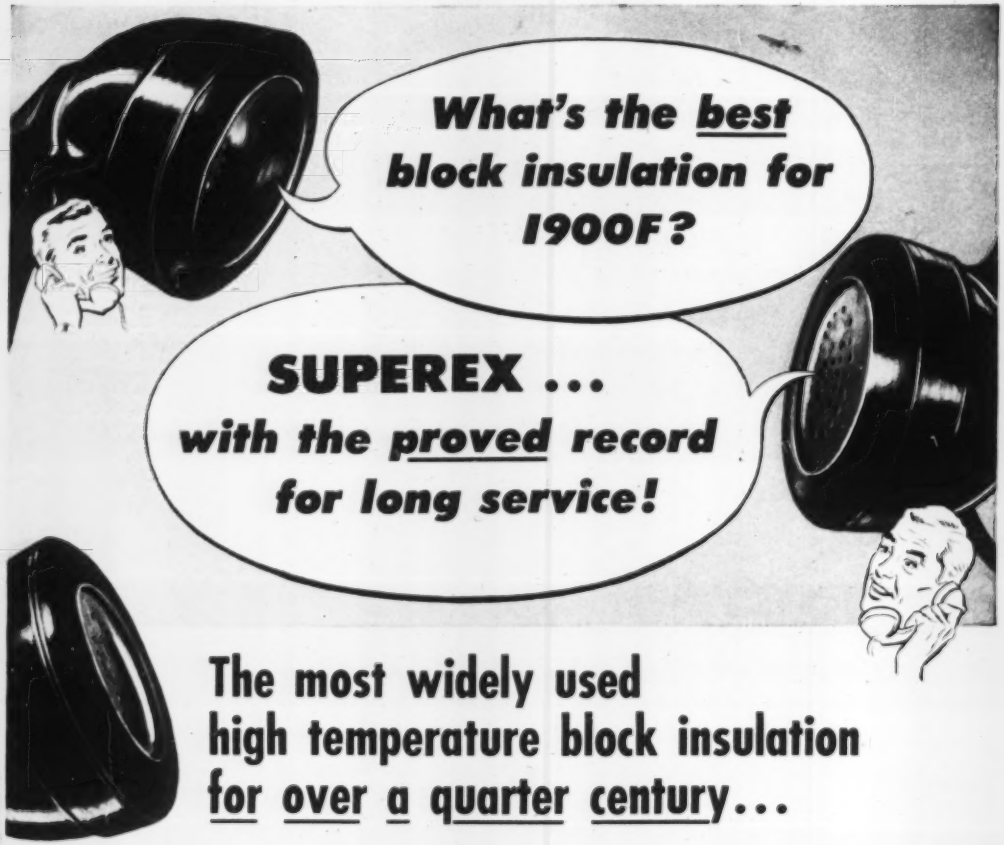
11 ***Fuel Economy*** . . . use diesel oil, natural gas or sewage gas for added economy.

12 ***Remote Locations*** . . . distance from transmission lines needn't curtail planned plant expansions.

13 ***Compact Power*** . . . Fairbanks-Morse engines give you more power per foot of floor space, more power on present foundation.

14 ***Minimum Attendance*** . . . Fairbanks-Morse "in-plant" generating sets require minimum supervision and maintenance.

15 ***Save Cost*** . . . of running in new line where present transformers and power lines are already loaded.



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SUPEREX® high temperature block insulation has long been industry's No. 1 choice for service-temperatures up to 1900F. It provides *major* economies . . . reduces fuel costs, cuts heat losses, keeps maintenance expense down, costs less to install and has long service life.

These are the reasons why 90% of the nation's hot blast stoves are Superex insulated . . . and why the low cost open hearth steel producers use Superex in their regenerators.

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Superex has been used with outstanding success in all types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, auxiliary power plant equipment, regenerators, kilns, roasters, high temperature mains, flues and stacks.

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Low thermal conductivity—Exceptionally high heat resistance (1900F) combined with excellent insulating value.

Light weight—Approximately 2 lb per sq ft per in thickness.

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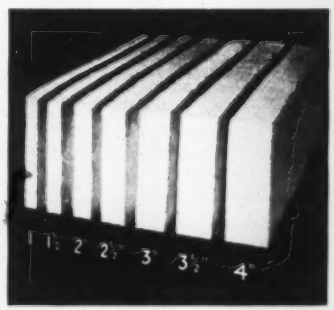
For complete information about Superex block insulation, write for Brochure IN-134A. Address Johns-Manville, Box 60, New York 16, N. Y. In Canada, write 199 Bay Street, Toronto 1, Ontario.



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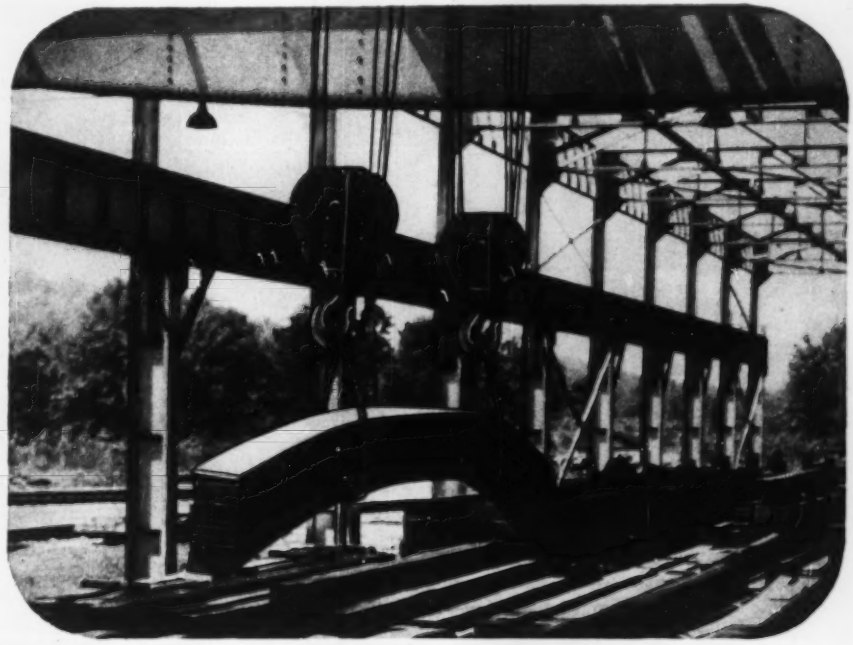

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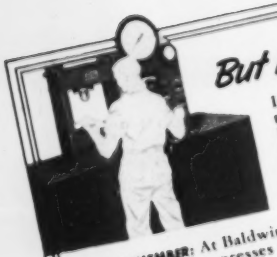

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REMEMBER: At Baldwin you can get one-source responsibility for all your presses from the very largest to the smallest.

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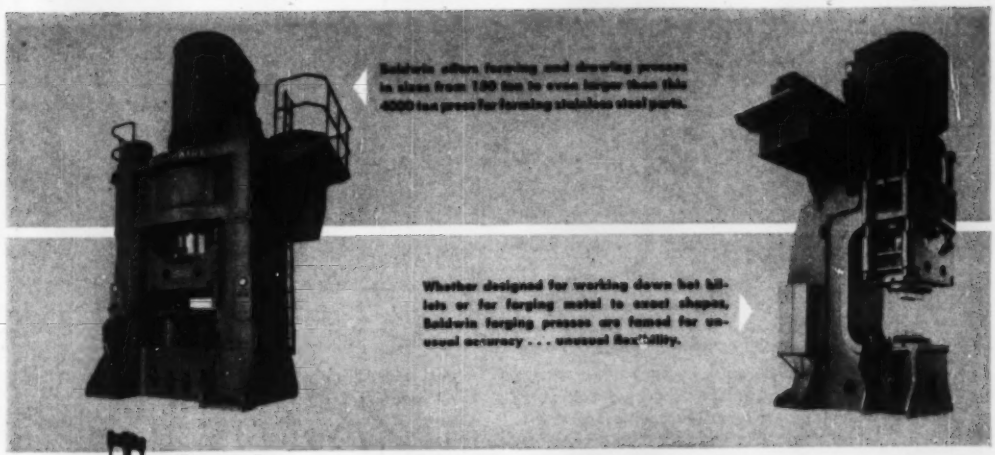

Baldwin offers forming and drawing presses in sizes from 150 ton to even larger than this 4000 ton press for forming stainless steel parts.

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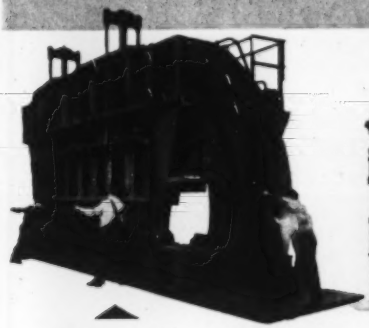
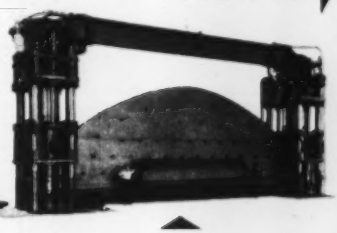
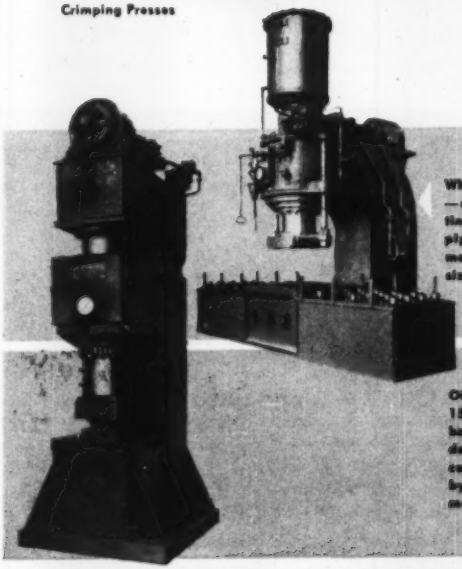


Crimping Presses



Bending Presses

Joggling Presses



Whatever your general press needs—utility, straightening, die-spotting, sizing, bulldozing, bushing, pipe-bending, others—Baldwin makes them in the widest range of sizes and pressures.

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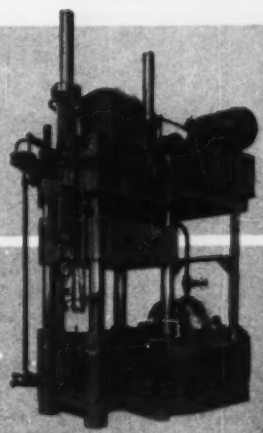

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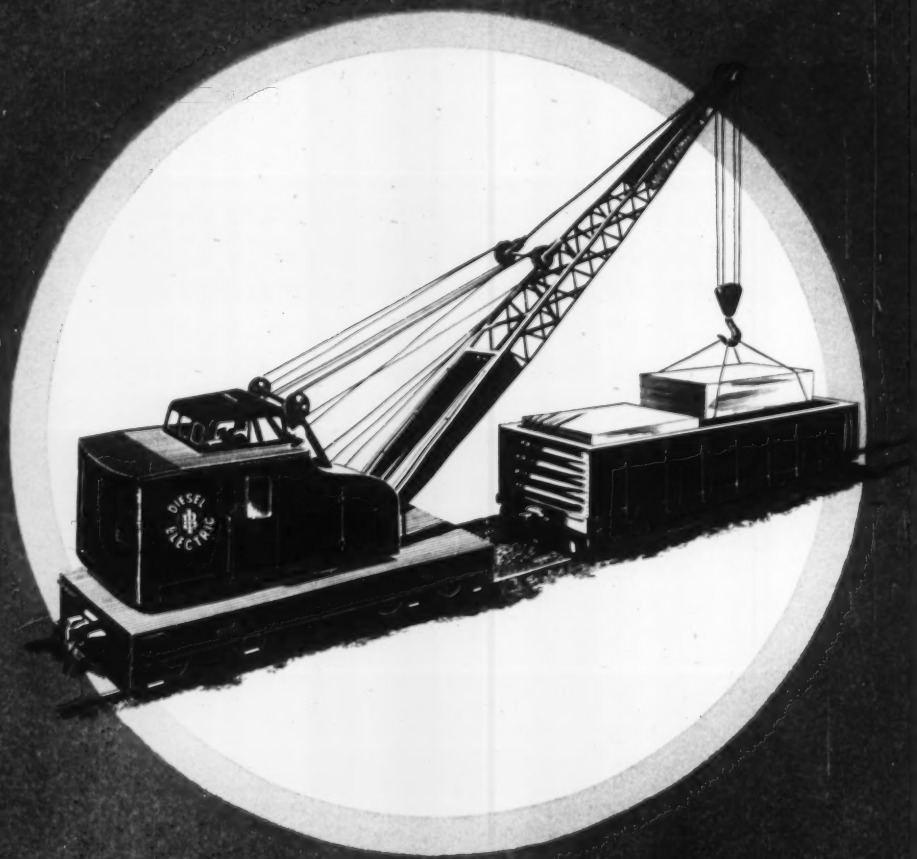
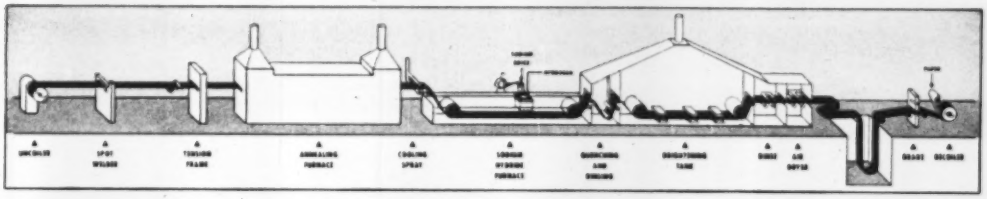
BROWNHOIST Diesel Electric Cranes
save time, save labor, save money

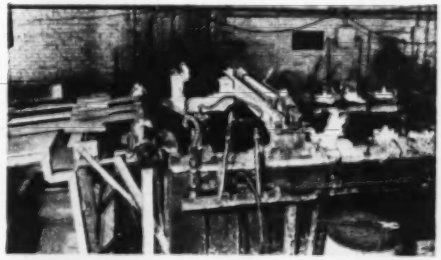


BROWNHOIST
builds better cranes

Remove Scale CONTINUOUSLY with the Du Pont Sodium Hydride Descaling Process



Successful operation in leading mills proves the adaptability of hydride descaling to continuous systems. Used in tandem with annealing, the sodium hydride process thoroughly descales stainless steel strip—in gauges of 0.010" to 0.125" and above. Particularly outstanding results are obtained with types 400 stainless steel, including the buffing grades. One fast "trip" through the hydride bath removes all scale . . . leaves the surface clean and bright, uniformly free from pits, etching and intergranular attack. So fast and thorough is hydride descaling, that the system is practicable for all common annealing speeds.



STAINLESS STEEL STRIP enters the hydride bath from the annealing furnace. Continuous hydride descaling equipment increases production and saves floor space . . . is easy and economical to operate.

BRIGHT, CLEAN STRIP—uniformly free of scale, smut and intergranular attack—leaves the hydride bath. The strip is perfectly prepared for finishing by buffing, for further processing or fabrication.

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- **ECONOMICAL TO OPERATE**—Permits savings in acid and metal . . . handles large volume of work in small space . . . is non-electrolytic.
- **HANDLES DIFFERENT METALS**—Alloy steel, stainless steel, nickel, copper, titanium and cobalt bearing alloys can be efficiently descaled—even in the same bath.
- **UNIFORM DESCALING**—All surfaces are uniformly descaled without need for special racking procedures.
- **USES LOW-COST EQUIPMENT**—(Carbon Steel Tanks). NO HYDROGEN EMBRITTLEMENT.
- **NO LOSS OF BASE METAL**—Bath action is reducing. Reaction stops when oxygen is removed from scale, eliminating pickling losses, etching and pitting.

FOR MORE INFORMATION about the Du Pont Sodium Hydride Descaling Process, get in touch with our nearest district or sales office or send the coupon below to: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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• When carbon formed on the valves of these air compressors and the oil in the crankcases had to be changed frequently, officials of the Hayes Industries, Jackson, Michigan, called in a Standard Oil lubrication specialist. He recommended STANOIL Industrial Oil, a multi-purpose oil containing effective oxidation and corrosion inhibitors. With STANOIL, the compressors gave the air to carbon troubles and have breezed through four years of hard operation without difficulty. Over the oil previously used, STANOIL has given four times longer service in the crankcases. These results . . . similar to the results you may expect . . . have led to the use of STANOIL in other equipment in this plant.

Find how this multi-purpose oil can benefit you by discussing it with a Standard lubrication specialist. You can contact him by phoning your local Standard Oil office.

Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

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L. H. Walker, who makes his headquarters at Standard's Detroit office, is the lubrication specialist who recommended STANOIL Industrial Oil to operators of this midwest plant and helped them solve a serious compressor lubrication problem.

L. H. Walker is one of a corps of able lubrication specialists who are located in Standard offices throughout the Midwest. These men have been specially trained in Standard Oil Lubrication Engineering Schools and, in addition, have a wealth of on-the-job experience. The specialist nearest your plant is ready to give prompt, expert, and thorough attention to your lubrication problems.

It's easy to obtain his services. A phone call to your nearest Standard Oil Company office will bring him quickly to your plant . . . with no obligation to you, of course.

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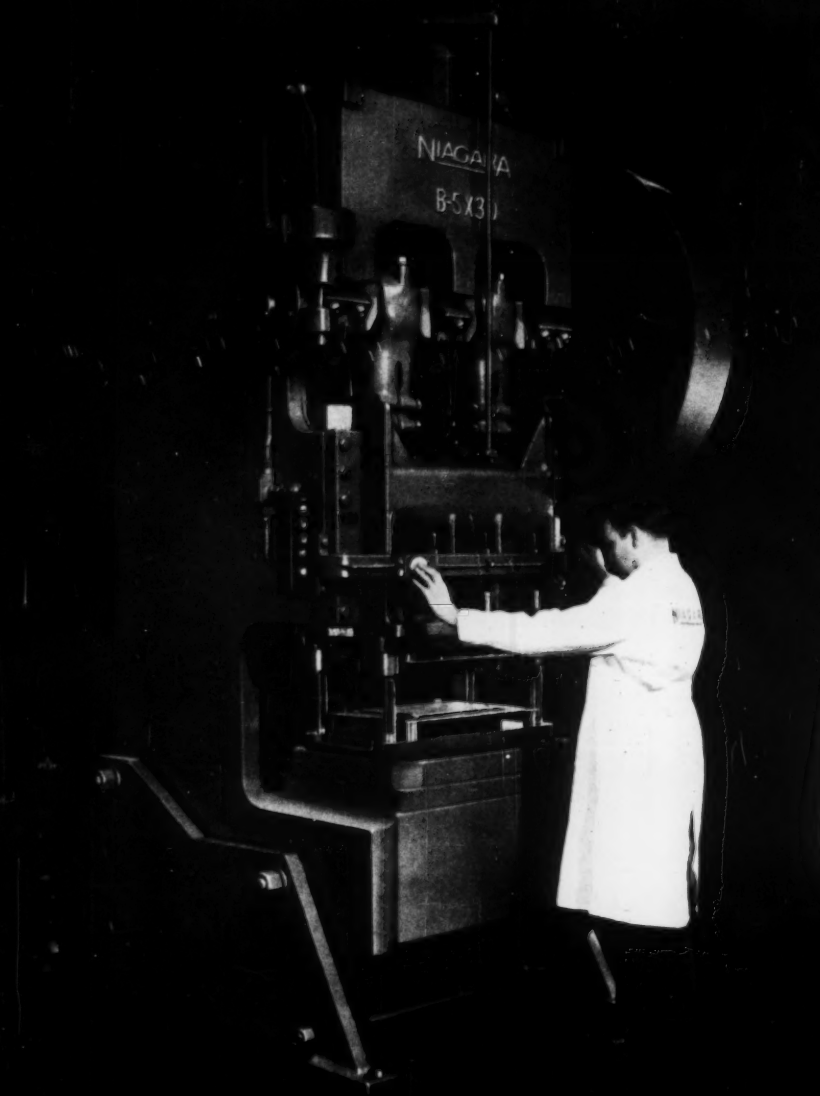
(INDIANA)

You'll find the means to significant savings in this booklet. It describes the important qualities of STANOIL Industrial Oil and the resultant benefits which have made this multi-purpose oil the choice of midwest manufacturers for a host of lubricating jobs. Discover how STANOIL will give you superior protection through its unique combination of six outstanding characteristics, including high stability and effective rust prevention. Find how STANOIL can simplify stock, storage, and inventory in your plant by replacing special-purpose oils in a wide variety of equipment. Ask the Standard lubrication specialist from your nearby Standard Oil office for this booklet, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

NIAGARA



for Defense Production

Niagara No. BI-5X30 Gap Frame Double Crank Inclinable Press fitted with magnetic perforating dies made by S. B. Whistler & Sons, Inc., Buffalo, N. Y. Press equipped with air actuated electrically controlled sleeve clutch

Write for Specifications

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

PRESENTS The NEW

No. BI-5x30 Double Crank Inclinable Press

Gap Frame with one-piece welded steel frame

- Gives full support to wide dies, impossible to obtain on the conventional single point Inclinable Press even with slide flanged out.
- Gibbing may be brought closer to point of load application on this double crank press than with flanged slide single crank design.
- Two point suspension resists tendency of slide to tilt under off-center loading conditions.
- Niagara gap frame construction gives equal access to all four sides of die. No ribs or shafts extending across the back of press.
- Inclined position permits finished work to drop off the rear of the press.
- Gearing enclosed and running in oil.
- Backshaft mounted on anti-friction bearings.
- Air counterbalance for slide.
- Bronze bushed main and connection bearings.
- Niagara electrically controlled air actuated sleeve clutch.
- Air releasing brake.

Similar presses are made in sizes ranging from 3½" to 6½" diameter shaft. Sizes 3½" and 4" are made with mechanically operated sleeve clutch.

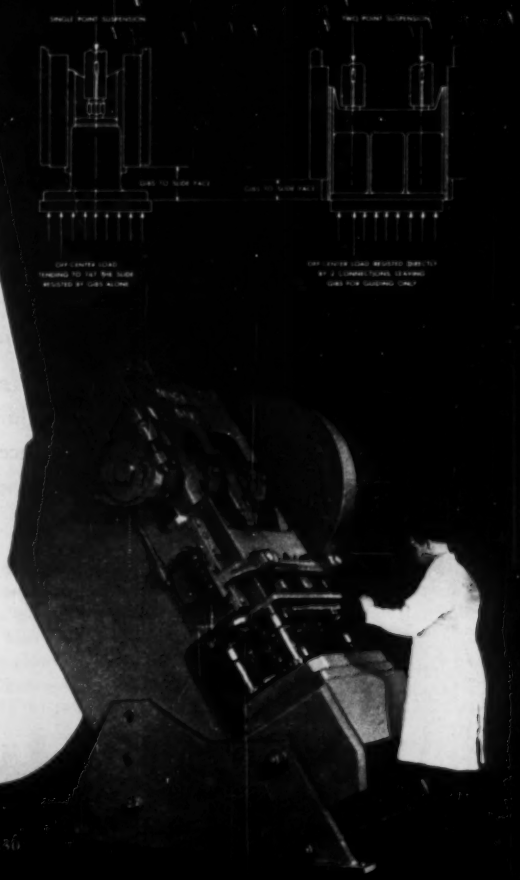


Illustration shows Niagara No. BI 5x30 press in inclined position

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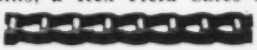
Why take it for granted?

We don't know the reason, but somehow chains seem to be taken for granted. If a chain for driving, timing or conveying has operated reasonably efficiently, that same chain is specified year after year. Yet, case after case shows that important savings can be made if these important functions are viewed with an eye for cost reduction and improved performance. For example:

• A manufacturer has been using a standard roller chain for years on his machine. A Rex Field Sales Engineer showed him that he could use a Baldwin-Rex Double Pitch Roller Chain and get the same operating efficiency at a substantial reduction in cost because speeds did not require standard roller chain.

• Another manufacturer had been using conventional flat top chain to carry cans through his machine. It was necessary to pay a premium for special bevel top plates to avoid tipping of cans. By switching to Rex Table Top® he got even smoother tip-free operation at far lower cost.

• In another instance, a Rex Field Sales Engineer persuaded a manufacturer to switch from the pin-and-cotter roller chain he was using to a Baldwin-Rex Riveted Roller Chain. The change not only resulted in an initial cost saving but in longer life since the rivets have greater holding power.

• To a manufacturer of construction machinery, who had been using cast manganese steel chains, a Rex Field Sales Engineer recommended the use of Rex Steel Chabelco Chains.  Since these chains are designed for efficient operation under dusty, dirty conditions, longer service life for both chains and sprockets at lower overall costs resulted.

Because Rex Field Sales Engineers have all the resources of a complete chain line at their command, they can recommend without prejudice the exact type or size of chain that will deliver the most efficient performance at the lowest cost to you and your customers. You'll find it will pay you to consult with him regarding your chain application problems. Call your nearest Field Sales Office, or write to Chain Belt Company—4660 W. Greenfield Ave., Milwaukee 1, Wisconsin.

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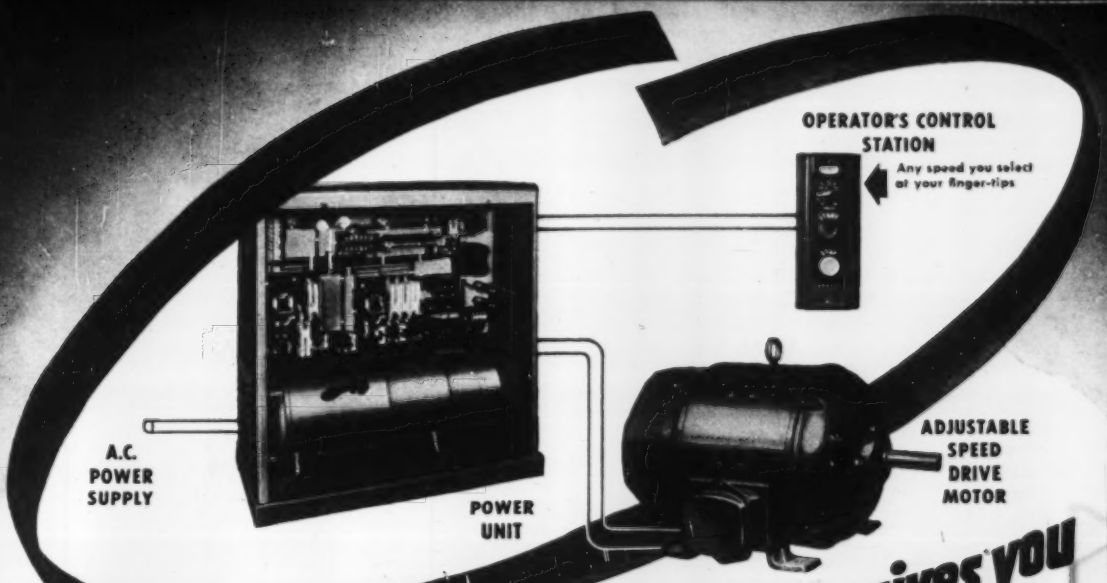

Louis Allis SELECT-A-SPEDE Drive gives you

PRECISION SPEED CONTROL FROM YOUR A.C. LINES

The real answer to many of your operating and production problems is right here — with the Louis Allis Select-A-Spede Drive, featuring the new Magnetic Amplifier Control. This drive provides unusual flexibility and positive control — flexibility and control you never thought possible from an A.C. line. You get increased production from your machines, fewer operating headaches, with the exact speed you need for your job — when you want it, where you want it.

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A size for practically every need — units up to 150 horsepower.

Trouble free operation — as a result of advanced design and the use of industrial duty components.

Stepless speed range — from 1/8 base speed or less to greater than base speed. Special designs permit speed ranges to five times base speed where required. A wide variety of optional features are available, too: inching, jogging, sequence control, reversing, dynamic braking, and multi-motor ranges.

Superior speed regulation — even at low threading speeds — better than required on most machines. Use of the magnetic amplifier and a special anti-hunt circuit maintains speed constant regardless of load.

Complete protection — against overload and runaway.

Clean, filtered air — supplied under pressure to power unit. Keeps dust and dirt out — reduces maintenance.

There are probably many operations in your own plant right now where a Select-A-Spede can save you time and trouble — boost production and efficiency.

Look into this drive's many unusual, practical features. Write today for further information about the money-saving advantages of the Louis Allis Select-A-Spede or contact the district office nearest you.

SA-101

THE LOUIS ALLIS CO., Milwaukee 7, Wisconsin

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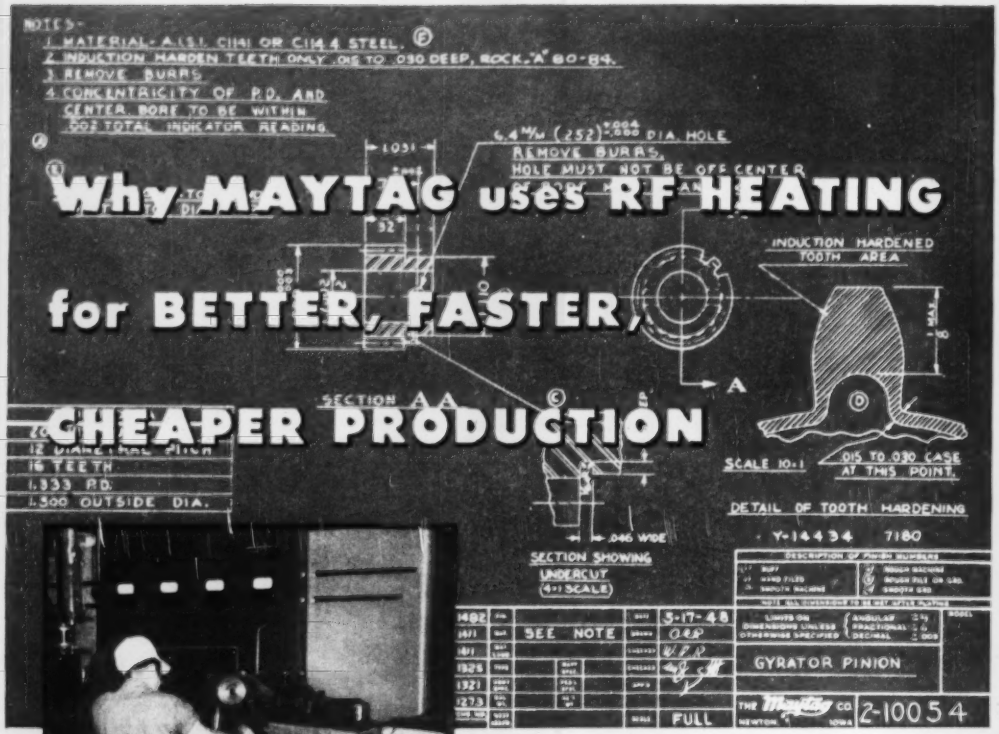
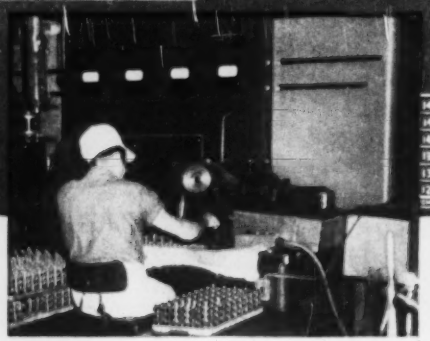
Why MAYTAG uses RF HEATING for BETTER, FASTER, CHEAPER PRODUCTION





● The Maytag Company has found, for fast production at low cost and high quality, Westinghouse RF Heating installations are the answer.

The installation of a process using two 20 KW-450 generators—for both spline and straight shaft hardening—has paid for itself in *less than 3 months!* This was shortly after World War II, and since then continued use has piled up real profit in savings.

In building a new plant for production of a completely new line of automatic washing machines, Maytag turned to induction heating for brazing and hardening . . . and they specified Westinghouse. A 50 KW and 10 KW RF generator, with associated work handling equipment, are now accounting for still further savings and continued high quality. That's why Maytag says that not only is the Westinghouse RF process the best method for heat treating production parts, but, also, "it produces precision work at the price of rough and ready work."

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J-02341

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Name

Company

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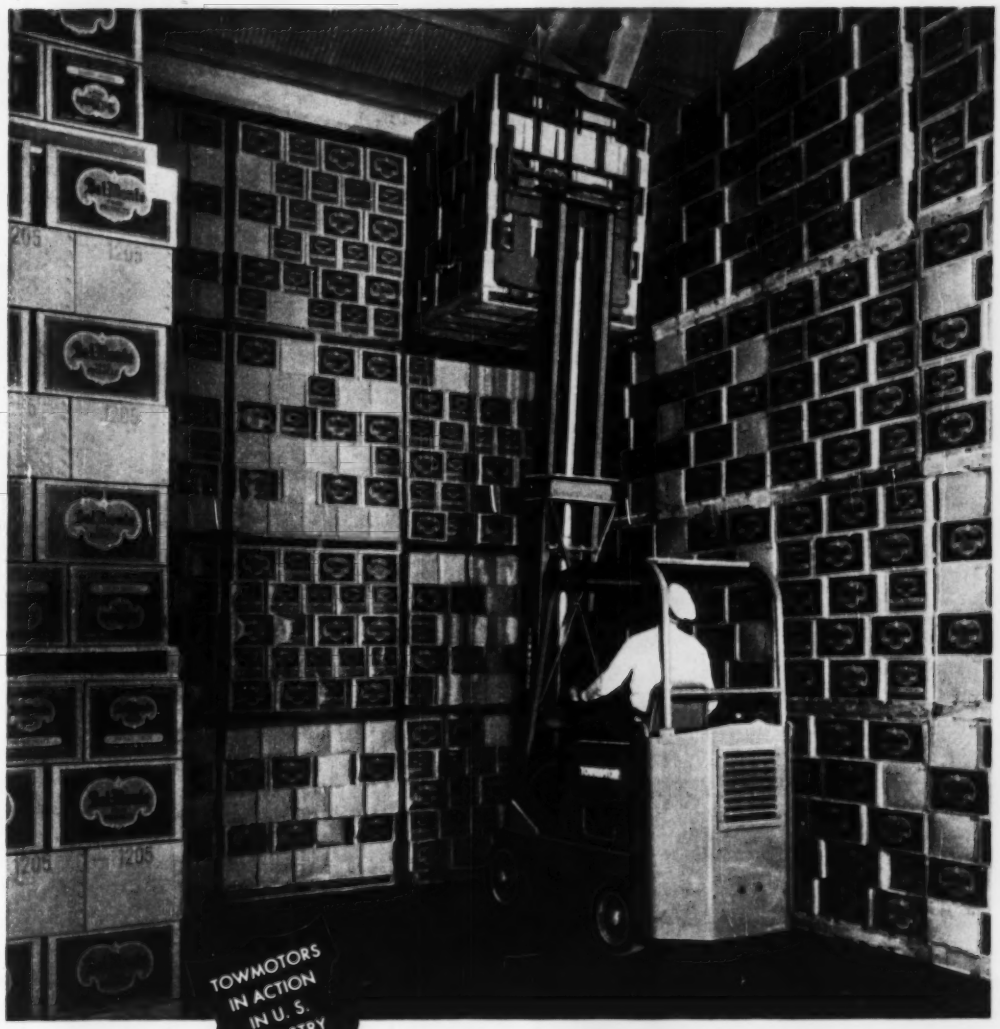

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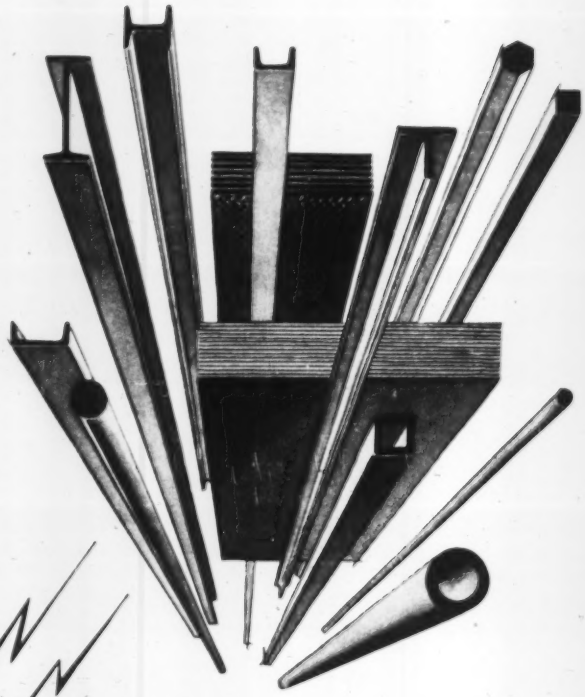

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When you call Ryerson for steel, you can be sure of prompt, personal service from the minute your call comes in. With the exception of those few items remaining in short supply, we can fill all your orders quickly from stock on hand. And to assist you on any problem of steel procurement, application or fabrication, the friendly counsel of experienced Ryerson specialists is always yours for the asking.

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April 28, 1952

Small Unions Speak Up

Watch for a flood of demands from small unions on smaller companies. Until a week ago, most of those unions were holding up until the steel picture clarified, but the dam has shown signs of breaking in the last seven days. From present indications, labor's demands on the little firms will be high. Die sinkers in northern Ohio, for example, have just presented a bill that would cost employers 43 cents more per hour per worker.

Two Washington Hot Seats Cool Off

Two hot seats in Washington are getting cooled off—but in different ways. Commerce Secretary Charles Sawyer in his role as boss of the seized steel industry is fanning away some of the heat by passing the buck. In a letter to Economic Stabilizer Roger Putnam, he neatly put on that man's shoulders the responsibility of determining the wage hike steelworkers will get. The other hot seat, that vacated by former Defense Boss Charles E. Wilson, is being cooled off by being left unoccupied. Thus far, the job has been offered to no industrialist. Defense Production Administrator Manly Fleischmann may be approached, but even he is undecided as to whether he would accept.

Schism on Decontrol

A significant schism in opinion on how to do away with controls is developing in Washington. The price controllers want only to "suspend" regulations. The controllers of materials and distribution in NPA have a more clear-cut approach of outright decontrol. OPS "suspends" by the inch. NPA decontrols by the foot. The latter agency's lifting of curbs on natural and synthetic rubber was the most sweeping decontrol action of the present emergency. Far-reaching decontrol of steel can still be expected by the end of this year or the first of next. The loss of steel thus far from strikes is not serious enough to wreck the timetable.

Trouble in Copper

But copper decontrols may have to be postponed still further. Of all major metals the outlook there is already the bleakest, and labor unrest in Chilean copper mines darkens prospects even more. Anaconda Copper Mining Co. is a big factor down there. The crisis may be resolved if Anaconda and other companies are permitted to exchange dollars into pesos at a free-market rate of about 90 pesos to the dollar. Now they are forced to exchange at a lower official exchange. The higher rate would enable the companies to meet labor's demands.

Brass Officials Demur

The government is expanding aluminum capacity "beyond reason," says one brass mill official. He claims the brass industry has ample

Production-Engineering News—p. 73 *The Market Outlook—p. 145*

capacity to meet any requirement, including shooting war. He also points out that a shift from brass to aluminum may render useless a company's expensive fabricating, tooling, heat-treating and finishing equipment.

Higher Plane Output?

Many aircraft models may soon be frozen, so that higher plane production will be possible. The climate of opinion is changing in the long, behind-the-scenes debate on whether we should strive for the greatest technological advance or the greatest output in aircraft. For a while, proponents of technological advance had the edge, but now the other side is winning.

After Floods: Building Boom

A Midwestern construction boom will follow in the wake of the floods. Nearly $1 million worth of work will be required to repair damage to irrigation projects alone. Total damage is as yet unknown, but it may well be the highest in U.S. history . . . Action on requests for emergency steel in the flood area are a little slow because all pleas must be screened. A few applicants have been caught chiseling.

Problems With Pins

Makers of such civilian items as safety pins are having a bad time. They can't get enough steel or brass, but their foreign competitors can. Result: A lot of foreign-made safety pins are finding buyers in this country. Foreign firms now have 25 per cent of the pin market here. A similar situation exists in bicycles, costume jewelry and other products. Quality of those American-made products has had to suffer because of controls, but foreign quality is improving, if anything.

Straws in the Wind

Over $1.6 billion will be spent this year by the government for scientific research and development; a survey is underway to determine industry's research-development capacity . . . A revised and simplified M-43, the construction machinery order, is being issued . . . Sulphur supply is improving . . . Refineries are trimming crude oil runs . . . GE cut automatic washer prices $30 to $50 . . . Certificates of necessity for 255 defense facilities costing $367 million were issued in the week ended Apr. 3 . . . The apprentice draft deferment order is being held up by a wording dispute . . . Facilities Review Board says it saved the government $50 million in four months by preventing duplication of plants by the armed forces.

What Industry Is Doing

Cutbacks in expansion loom because of wage-price uncertainty (p. 45) . . . Steel warehousemen see normal selling of most products by mid-year (p. 46) . . . Machine tool output should be spurred by "numerical preference list" to record rate by July (p. 47) . . . Foreign tools, renegotiation worry machine tool distributors (p. 47) . . . Rail freight hikes will put distant mills at a disadvantage when competition sharpens (p. 48) . . . Road building equipment future looks rosy (p. 49) . . . Restricted price relief is offered some manufacturers (p. 50).

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CLUTCH HEAD® SCREWS

Here are four GOOD reasons why you should use Clutch Head screws in your assembly lines:

1. The deep straight-walled recess requires less "end pressure" and prevents screw driver ride-out.
2. Over and over again you can bring back the Type "A" bit to full efficiency by just grinding back the point.
3. See how the "lock-on" feature resists dis-engagement. What a help in hard-to-get-at places!
4. The strong substantial Type "A" bit with the large roomy entrance speeds up assemblies.

Ask for a descriptive brochure.

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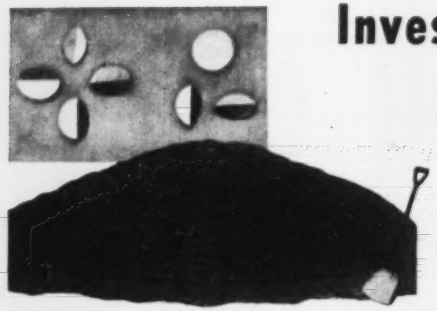
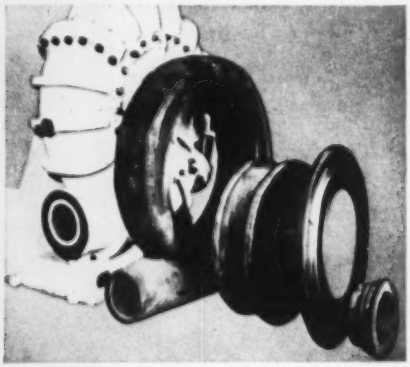


SEE FOR YOURSELF why NI-HARD cuts grinding costs. Unlike other cast irons, NI-HARD is composed of a multitude of hard carbides firmly embedded in a matrix which is as hard as fully hardened steel. Ni-Hard balls are produced in sizes from $\frac{3}{8}$" to $1\frac{1}{4}$". Balls at left above are sectioned to show soundness.

THESE BALL MILL LINERS of chilled NI-HARD replace rolled steel liners for milling ores. The user previously used all types of liner materials, including manganese steel, chilled iron, etc., before standardizing on NI-HARD.



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Ni-Hard® . . . an abrasion-resisting nickel iron . . . has proved the answer to hundreds of problems involving severe abrasive wear. During the past 20 years it has set notable records for length of service, down-time saving and *ultimate economy* where wear-resistance is the primary requirement. A few typical Ni-Hard applications are illustrated.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of NI-HARD for many end uses in defense and defense supporting industries. There are authorized foundries, from coast to coast, equipped to produce NI-HARD castings in all common forms and shapes.

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Showdown!

Last week's developments in the steel wage-price-seizure mess indicated rather clearly that the government—chastened by a wave of criticism of its actions to date—is moving more cautiously. The decision on a wage increase, which had been promised for last Monday or Tuesday was stalled along until Wednesday, at which time Secretary of Commerce Sawyer announced he had turned over to Roger L. Putnam, Economic Stabilization Administrator, the unwelcome task of drafting an order for lifting steel wages.

Mr. Putnam, in turn, explained that the job would require time, that legal questions would require consultation with the Attorney General and that a recommendation regarding wages could not be expected until sometime during the week of Apr. 28. When the recommendation is ready, it will be submitted to Mr. Sawyer who in turn will submit it to President Truman. If he approves it, then Secretary Sawyer will issue it as an order.

Meanwhile, Mr. Putnam last Wednesday asked Price Stabilizer Ellis Arnall to put into effect a regulation that would permit steel companies to increase prices up to nearly $3 a ton this week in accordance with the Capehart amendment. The stalling on wages, coupled with the more prompt action on prices, appears to be a government maneuver to set the stage a bit more carefully before exposing its hand on the wage increase.

Simultaneously criticism against the action of the government was spreading. A vote in the Senate to suspend rules, which would have barred the use of federal funds for operation of the steel mills, was 47 to 29—only four short of the two-thirds majority required. Numerous organizations, including the American Newspaper Publishers Association, were adopting resolutions censuring President Truman for his high-handed actions.

Seizure of the steel industry should be fought by every lover of freedom in the nation. If Mr. Truman can establish the steel seizure as a precedent, then he or another President can go even farther next time. It is important for every American, including every member of a labor union, that this seizure be branded by the courts as illegal.

E. L. Shaner

EDITOR-IN-CHIEF

"CATCH-UP" IS A FAKE: In order to understand how your government deceives you on behalf of the steel union, examine the charts on page 45. On the right are figures presented by Chairman Feinsinger of the Wage Stabilization Board to support his fallacious theory that steel employees deserve a wage increase to "catch up" with increases granted in other in-

dustries. The chart on the left shows an undistorted version of the government's figures.

By using Dec. 2, 1950, as the base date, Mr. Feinsinger ignores the 21-cent-an-hour increase granted steelworkers on Dec. 1, 1950. Also he uses awards to employees in selected companies instead of industry averages. By these deliberate fakings he tries to justify a new head start for steel employees. This would pave the way for a new round of "catch-ups" for employees in other industries.

* * *

HOW TO TRIM BUDGET: Last week the Committee for Economic Development issued a report stating that the $10.4 billion cash deficit indicated in the President's budget message can be eliminated without raising taxes or damaging the security programs. This is based upon a calculation that actual expenditures for military functions and for foreign military aid will lag at least $3.5 billion behind the President's estimate of $58 billion, an estimate that $4 billion can be saved by eliminating waste and inefficiency in the military programs and the recommendation that about $2.8 billion be cut from the $26.7 billion proposed for other than military and foreign aid expenditures.

Previously Sen. Paul H. Douglas of Illinois and Sen. Harry A. Byrd of Virginia, Democrats, and Congressman Charles W. Vursell of Illinois, Republican, had estimated that amounts of $7 billion, $9 billion and $15 billion, respectively, could be pared from the 1952-53 budget. When businessmen and politicians of both parties view possibilities for retrenchment in such substantial terms, how can the President justify the defiance of economy that he voiced in his "turnip day" harangue?

* * *

HANDWRITING ON WALL: Leafing through the pages of this issue you will find numerous news items which point to the probability that a return to orthodox selling can be expected shortly. A quick check of steel warehousemen indicates many of them foresee that normal selling conditions may prevail by midyear. A spokesman for an electrical manufacturer points out that we are at the dawn of a period when selling may be the major problem of industry instead of production.

A buyers' market will bring headaches to some sellers who have had it pretty soft for a long time but it also will breathe new life into the law of supply and demand. Now is the time to plan for more aggressive selling.

* * *

CHALLENGE IS NOT NEW: Much is being written these days about the challenge which the proper machining of alloys for jet engine parts imposes upon designers of machine tools and tool engineers. We are told that machines must be designed to cope with difficult-to-machine metals, components of larger diameter and thinner wall sections, close tolerances, interchangeability and higher production rates. These exacting demands call for increased horsepower, heavier beds, improved bearings, variable speed drives and automatic means of handling and contouring. They also call for new attention to design and type of cutting tools, accessory tooling, speeds, feeds and coolants.

Some of these demands will have a familiar ring to old-timers who remember the frequent occasions in the past when new machining problems or new cutting materials (such as cemented carbides) have called for more power, greater rigidity, higher speeds, closer tolerances, etc. The jet engine is simply the latest of a series of developments which have created an almost continuous demand for improvement in machining facilities.

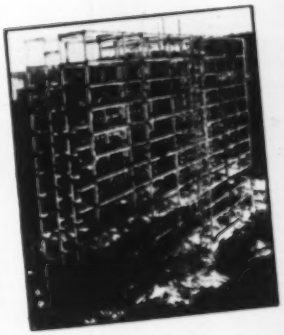
* * *

HARRY HARRIES STEEL: An alert editorial writer of the *Detroit News* last week suggested that if the writers of advertising copy for the steel companies in the wage and price controversy run out of ammunition, they might profitably consult Webster's dictionary. Under "harry," transitive verb, they will find this preferred definition: "1. To make a hostile invasion or raid upon, with destruction or seizure of property; to ravage; despoil; pillage; lay waste."

Having gone this far in making light of a serious topic, why not go the limit! Webster's next entry is "Harry." It is defined as "1. Masculine proper name. 2. Plural (Harrys) playing cards of a cheap grade, having a picture of King Henry VIII on the wrapper. 3. The Devil, in such phrases as Old Harry, Lord Harry."

Between Webster's definition of harry the verb and Harry the proper noun, Mr. Truman is cast in an unenviable role.

ALL WELDED



All-welded 12-story Highland Apartments, Birmingham, Alabama.

FABRICATED BY

All-welded 17-story Texas Company office building, New Orleans, La.

THE INGALLS IRON WORKS COMPANY

All-welded addition to Mount Sinai Hospital, New York City.

BIRMINGHAM, ALA.

INGALLS

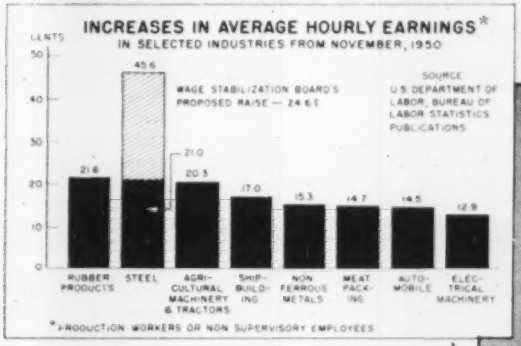
Sales Offices: New York, Chicago, Pittsburgh
Plants: Birmingham, Ala., Verona, Pa., North Birmingham, Ala., Pascagoula, Miss., Decatur, Ala.

STEEL MINE

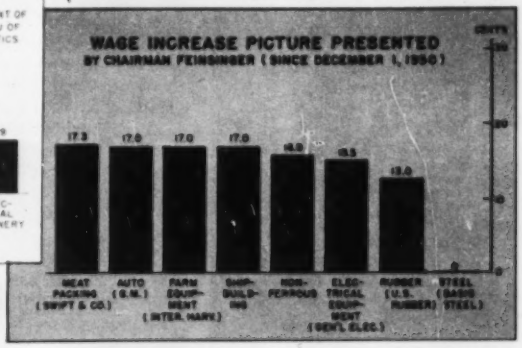
If American industry will "mine" its dormant scrap—the obsolete and worn-out machinery and equipment hidden, overlooked and forgotten in its plants and yards—present record-high steel production can continue.

INLAND STEEL COMPANY
38 South Dearborn Street
Chicago 3, Illinois

STEEL WAGE PICTURES AS PRESENTED BY THE INDUSTRY AND BY WSB



U. S. Steel's John Stephens' industry-average comparison includes the 1950 steel wage boosts, paints a truer picture of wage relationship. His chart lists WSB-recommended hikes at 24.6 cents, a sum workers would get directly



WSB's Nathan Feinsinger uses a "comparison" pegged at Dec. 2, 1950, just after the steel union got its 1950 wage boost. He also uses wage rates for selected non-steel firms which compare unfairly with wage rates in the whole steel industry

Slowdown in Steel Expansion?

The wage-price case is causing many firms to reconsider their programs as the squeeze on profits increases. Terms on many expansion loans are also unattractive

THE ANNOUNCED steel expansion program will be cut back slightly. More importantly, many unannounced, but contemplated, projects will be tabled.

One reason: The seizure of the steel industry and the expected wage increases without fully compensating price hikes make profits uncertain and financing problems more difficult. At least one major and one minor steel firm have already definitely tabled construction plans. Other companies are considering the step.

Dictated — A government edict granting the steelworkers wage increases is expected this week—unless prohibited by injunction. Commerce Secretary Charles Sawyer has called on Economic Stabilizer Roger Putnam to name terms. There'll probably be a wage hike near the original WSB recommendations. The price "concession" will still be less than $3. Last week Mr. Putnam ordered Price Chief Ellis Arnall to issue a Capehart regulation for steel. Steel companies don't want it because it permits average boosts of only $2.84 to $3 a ton.

That puts a tighter squeeze on profits, from which part of the steel expansion program must be financed. Steel companies are having trouble borrowing money at attractive terms. Interest required has been as high as 5 or 6 per cent.

Only Alternative—So, steel men are forced to reconsider their expansion plans. Programs already announced will be cut back only moderately because most of them are too far along to stop or even curtail. The ingot capacity target of 120 million tons aimed at for 1953 will not be bulls-eyed, although the shot will be a near miss. But the biggest cuts are being considered for programs not yet announced. Not as spectacular as the jobs currently under construction, the unannounced projects nevertheless are important, especially to fill in some of the gaps in the present program. Most of the unannounced construction would have been to increase blast furnace and coke oven capacity, round out rolling mill facilities, etc.

Armco Steel Corp. will go ahead with expansion already underway, but it will shelve other contemplated projects costing between $45 and $50 million, "because our taxes are so high, we don't know what wages we are going to pay, and we don't know what prices we are going to get," says President W. W. Sebald. Judson Steel Corp., Emeryville Calif., will also table a proposed expansion plan.

Too Far Along — U. S. Steel Corp. reportedly will continue with present expansions, but its future plans are in doubt. R. C. Tyson, vice president and comptroller, says higher wages without a fully compensating price rise "threaten the expansion of steel-producing capacity." Jones & Laughlin Steel Corp.'s chairman, Ben Moreell, says, "we may not even finish what we have underway. It depends on what they do to us." National Steel Corp. plans no change in projects already underway. Youngstown Sheet & Tube Co. says its current expansion has gone too far to stop, but it considers it foolish to go ahead with anything more. Inland Steel Co. plans no change in its expansion program.

Colorado Fuel & Iron Corp. contemplates no curtailment in its present expansions, which are well along, but it may think twice in going ahead with work in the tentative planning stage. Allegheny Ludlum Steel Corp. reports that if the final decision in the wage case is adverse, "we'll have to look at our construction program for next year because plans financing it

call for partial financing from profits." If profits are sharply curtailed, Allegheny Ludlum — and other steel companies — may end up by being forced to lower their current expansion sights.

WALTER H. WIEWEL
. . . Sawyer aide in steel job

Crucible Man To Be Sawyer Aide

Walter H. Wiewel has been appointed chief adviser to Secretary of Commerce Charles Sawyer in running the government-seized steel plants of the nation. In a new set-up styled "Organization for Steel Industry Operations," Mr. Wiewel is to serve as production officer and as liaison officer with the operating managers of the industry. In these capacities he will report to and advise Secretary Sawyer and in routine matters will act as his spokesman.

C. Dickerman Williams, solicitor of the Commerce Department also has been designated solicitor of the new Organization for Steel Industry Operations. Nicholas Allen, an NPA lawyer, has been named compliance director of the group. Walter Dupka, retired vice president of Jones & Laughlin Steel Corp., becomes comptroller.

Mr. Wiewel, who is on leave from his post as vice president in charge of sales, Crucible Steel Co. of America, had been serving as assistant NPA administrator, in charge of the Metals and Minerals Bureau.

Warehouse Steel: Normal Selling Soon

If no interruptions in steel output occur, warehousemen foresee an easy supply by midyear of nearly all steel products. The situation in many lines is already good

YOU MAY SOON get nearly all the warehouse steel you need. Warehousemen foresee a return to normal selling conditions by midyear, if there's no more curtailment in steel production.

Your chances are better if you want flat-rolled sheets or strip, straight chrome stainless, smaller cold-finished bars, light angles (1 inch x 1 inch and under), electric-welded pipe in sizes under 6 inches, nails (except galvanized roofing types), and other merchant wire products.

Familiar Story—You'll probably get the same story if you want any grade of nickel stainless, large bars, including heavy flats and large rounds, low-alloy high-tensile products, heavy plates, and most sizes of structurals.

Warehouse inventories have been gradually growing since the beginning of the year. American Steel Warehouse Association, Cleveland, reports that a survey of leading warehouses across the country shows inventories increasing by about 10 per cent a month over the last four months. But, supplies are unbalanced and where you can get 5-inch rounds, for example, you may not be able to get 4-inch or 6-inch rounds. These poor product mixes in the warehouses are blamed on government controls and ordering which tie up available mill capacity for one size, leaving the neighboring sizes in scarcity.

Return to Normal—In fact, if you don't want to call the warehouse at all, just sit back. Chances are a warehouse salesman will come to see you. Salesmen are now out to sell anyone, not just the old regular customers.

The slowdown in steel output which occurred prior to government seizure of the steel mills did not seriously disjoint warehouse operations. There wasn't much scare buying, mostly because government orders forbade it at the crucial time. A warning that perhaps the full effects of the slowdown have not yet been felt, though, is sounded by A. L. Peterson, general manager, Joseph T. Ryerson & Son Inc., Pittsburgh. "I think the mills tried to clean up everything they could through Apr. 8, and they didn't have much backlog of stuff ready to ship. One of these days we are going to find ouselves not getting receipts that we ought to because the mills are that far behind." And R. J. Foster, secretary, Republic Structural Iron Works, Cleveland, estimates a loss of 25 per cent of March receipts.

Embarrassing Overexpansion?

Have we expanded our industrial capacities to a point that may be embarrassing in the future? That question was raised by E. L. Shaner, Editor-in-Chief, STEEL, in reviewing "The General Outlook for Metals" at the 34th annual meeting of the American Zinc Institute, St. Louis, last week.

"As an offset against whatever price we may be called on to pay as penance for our past and present economic follies," said Mr. Shaner, "there is an important factor that we dare not overlook: The unexpected growth of our country in recent years and the generally-enhanced ability of our people to consume more of the products of industry."

J & L To Hot Extrude Steel

Equipment for producing steel sections by the Ugine-Sejournet hot extrusion process is on order for Jones & Laughlin Steel Corp.'s Pittsburgh Works.

Hydropress Inc., New York, is to supply the equipment. It is expected to come into operation about a year from now.

The Ugine-Sejournet hot extrusion process is a relatively new method of producing steel sections of more varied and intricate form than is possible in a conventional rolling mill.

The process was developed in France. J & L is licensed to use it.

Machine Tool Output Record Coming

Numerical preference list, more materials and components and less red tape should foster a record rate by July. But foreign trade prospects are gloomy

PRIORITY OF machine tool deliveries will be governed in the future by a "numerical preference list" similar to that used by the War Production Board during World War II.

Feeding Formula — Designed to expedite the delivery of rated orders to defense contractors, the new ruling provides a formula based on 14 restricted priority groups. The formula is to be applied by the machine tool builder himself in systematizing the delivery of machines so that defense producers will get delivery in proper sequence of urgency.

Previous to issuance of the amendment to Order M-41 by NPA, broad regulations covered the priority of deliveries among the various contractors without explicit urgency specifications.

In the Chips—Part of the reason for the new change: Shipments of the machine tool industry are currently exceeding an annual rate of $1 billion, highest since the peak war year of 1942. NPA was swamped handling the scheduling of machines for urgent programs and the central office effort became administratively impossible.

The decade-ago record should be shattered by July when shipments are expected to hit the $1.3 billion annual rate despite substantial cancellations of machine tool orders. National Machine Tool Builders' Association says, "Cancellations do not represent a diminution in the machine tool program, but an intelligent and necessary revision in light of changing plans and circumstances."

Even after allowing for cancellations, it is estimated that the industry has a backlog today of approximately $1.4 billion. Incoming orders still exceed shipments.

First quarter, 1952, found machine tool builders with all the material and component parts they needed. Not since Korea had the supply been adequate. Major plaudits go to Metalworking Equipment Division of the NPA.

MAKING AUTOMATIC CHUCKERS
. . . tool building nears record

Not All Rosy — Machine tool builders still have problems. Lack of rated orders is crippling some producers of smaller machine tools. NPA took a step toward easing this situation by freeing all machine tools under $1000 value from rating restrictions. Former minimum was $350. Under the old setup, many machines worth $350 to $1000 were subject to the red tape of rating restrictions which many buyers didn't wish to bother with. As a result, that classification costing from $350 to $1000 didn't sell well. The new ruling should relieve the situation.

Another sore spot is five-year amortization. Certificates of necessity in World War II contained a telescoping provision which permitted the amortization to be spread over five years or over the duration of the emergency, whichever was shorter. The present law contains no telescoping provision, a feature which the industry would like to see.

European Conundrum — Long-range worry stems from the effect of rating on normal peacetime markets. Not only are many normal domestic users getting short-sheeted, but also the European market. Over the years foreign markets have accounted for approximately 25 per cent of American machine tool orders. By February of this year, the figure had dropped to 4.5 per cent, lowest on record.

Cause: American machine tool companies are permitted to ship only rated orders to Europe—and European customers find it extremely difficult to get ratings. Result: Machine tool dealers selling American machines in Europe are becoming desperate and may be forced of necessity to shift to European models. Aiding and abetting: American foreign aid has fostered the European machine tool industry to the complete disregard of the ultimate effect of this policy upon the U. S. machine tool industry.

NMTBA points out that foreign sales have always been the mainstay of the American machine tool industry in recurring periods of decline in the domestic market.

Double Headache

Machine tool distributors worry about renegotiation and foreign tools at a Chicago meeting

RENEGOTIATION and influx of foreign machine tools are the major problems concerning the membership of the American Machine Tool Distributors' Association.

With reports to the Renegotiation Board due on May 1, the distributors are anxious not to repeat mistakes made at the close of World War II. Many dealers escaped with little more than their skins at the close of their dealings with renegotiators and entered a period of slow business with working capital at low ebb.

Lack of Understanding—Part of the difficulty was caused by lack of understanding on the part of renegotiators as to the engineering service performerd by distributors. Some of the distributors failed to take advantage of the exemptions permissible under the act and so contributed to their own downfall. Working through the association, the distributors are trying to make their contributions understood both

by the principal board in Washington and the regional boards.

Survey teams are needed to make a complete inventory of all government-owned machine tools to put unassigned machines to work in the jobs where they will do the most good, Swan E. Bergstrom, former director of NPA's Metalworking Machinery Division, told the distributors. Distributors are well qualified to make a major contribution in this job, he believes. They can also make sure the machinery ordered is really needed.

Good Shape—Keeping our industrial plants in good running order and ready for any emergency requires a levelling out of the boom and bust in machine tools, Frederick S. Blackall Jr. said. Revision in depreciation regulations to encourage machinery replacement, renegotiation procedures permitting retention of adequate earnings from boom periods, stand by pool orders and a halt in subsidization of foreign machine tools were among the recommendations made by the National Machine Tool Builders' Association president.

Special Tools Still Hard To Get

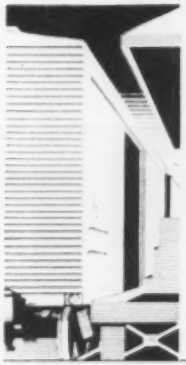
The backlog of unfilled orders for special tools, dies, jigs, fixtures, gages, molds and specially designed machines continues at near-record levels, says the National Tool & Die Manufacturers' Association. An industry-wide survey shows a backlog four times that of two years ago.

Heavy cancellations caused by the stretching out of the defense program have resulted in a small decline since the first of the year.

Tool Orders: DO's and DO-n'ts

Outstanding orders for metalworking machinery which held the DO-46 rating were not affected by issuance of Direction 5 to CMP Regulation 6 on Mar. 6, 1952, says NPA. Some buyers and sellers were confused by the order.

DO-46 orders were given out prior to the Controlled Materials Plan and most have been filled; however, those outstanding do not need to be converted to DO-Z3 orders. DO-U4 orders, on the other hand, must be coverted to DO-Z3 orders under the directive.



Before-and-After Picture in Rail Rates

(cents per hundredweight)

	OLD	NEW
Pittsburgh-Detroit*	39.29	41.46
Cleveland-Detroit*	28.06	29.61
Sparrows Point-New York*	34.80	36.72
Chicago-Milwaukee*	16.84	17.77
Birmingham-Atlanta**	34.94	37.90
Los Angeles-San Diego***	22.93	24.87

* 80,000 pound car lot, 3 per cent federal tax included

** 60,000 pound car lot, 3 per cent federal tax included

*** 40,000 pound car lot, 3 per cent federal tax included

Rail Hike Puts Distant Mills at Freight Disadvantage

THE HIGHER rail freight rates that go into force May 2 won't have any effect on the steel distribution pattern immediately, but they will when — and if — the mills have to fight for business and are forced to absorb freight extensively to lure buyers.

The practice of freight absorption is legal (if there's no collusion), but it's not practiced widely now. In times of plentiful steel, it may be adopted more extensively, especially in situations such as those for Cleveland and Pittsburgh mills. Steel men in both those cities compete for Detroit markets, although Cleveland has a marked freight advantage (see the accompanying table) which is increased slightly by the new tariffs. The rate differential is a shade over 11 cents under existing schedules, will be nearly 12 cents under the new. The Pittsburgh mills may eventually have to absorb part of the freight to meet Cleveland competition. The same situation will arise between Bethlehem Steel Co.'s Sparrows Point, Md., plant and U. S. Steel Corp.'s new Morrisville, Pa., facilities.

Change—On May 2 most freight rates will be figured as the base rate plus 15 per cent of that, instead of the base plus 9 per cent in the Eastern territory and the base plus 6 per cent in the South and West that's in force now. Many base rates were last adjusted June 30, 1946.

The immediate effect on buyers of steel will simply be to boost their costs. Sometime in the future, they may shift to a closer mill if steel becomes more plentiful. Even a more marked shift to trucks is not expected because those rates are now in the process of an upward adjustment. When the final new truck tariffs are decided upon, the spread between rail and truck rates (already in favor of trucks in most instances) will be about the same as it is now. The total cost of the increase to all shippers will be an estimated $678 million, most of which will have to be absorbed by the original payer of the freight unless OPS rewrites many of its pricing orders.

Up and Up—Over the country, the aggregate increase in rail rates will be 6.8 per cent above the old tariffs. The new rates will, in the aggregate, be 78.9 per cent above those in effect June 30, 1946. The new rates expire Feb. 28, 1954.

For a dollar-and-cents idea of the increase, take a look at the accompanying table which gives a few freight charges on steel.

Small Trains Set Big Record

Lionel Corp. is clearing its "0-gage" tracks for a record production of toy electric trains this year, says Lawrence Cowen, president. He says that "orders will be filled providing ample raw materials are available."

Since 1946, an estimated $185 million worth of Lionels have been sold. A high birthrate and extensive electrification assures the company of continued high sales in the near future.

Authenticated News

MORE MACHINES ARE NEEDED TO BUILD ROADS
. . . and old equipment makes it hard to meet competitive prices

Smooth Highway for Road Equipment

Repair work and allocations give the clues to another near-record year for road building equipment production. Military buying could upset the outlook

ROAD BUILDING EQUIPMENT makers expect 1952 to be another good year—better than 1950, but probably not as good as 1951. Last year was a banner one with sales amounting to $1.8 billion. That was about 20 per cent better than 1950.

Two things give equipment makers basis for optimism: Repair shops are loaded with old equipment being patched up and materials for making new rigs are more plentiful.

Charles Weber, Thew Shovel Co., Lorain, O., says, "Our distributors' repair shops are jammed to the gills and they're screaming for repair parts. Some of these calls are for parts we haven't made in ten years and for machines which are themselves 20 years old." A Pittsburgh equipment distributor says, in commenting on the condition of equipment in the hands of contractors, "I would say they can get by, but it is working a hardship on them."

Do More with Less—Accentuating the need of contractors to replace older equipment has been a gradual rise in operating costs during the past several years. The trend is toward larger loads, more power and higher operating speeds. Most road builders today require about 50 pieces of mechanized equipment, from pumps to paving machinery, in order to operate competitively.

In trying to satisfy this civilian demand while fulfilling defense requirements, the industry in general has been held to about 75 per cent of the materials needed for peak production. Items of equipment that are most in demand by the military are given a relatively greater percentage of their peak requirements.

Spotty Prospects—Reports Julian R. Steelman, president of American Road Builders Association: Heavy tractors and medium size shovels required by the military will be difficult for civilian buyers to obtain in 1952. Small crawler tractors and rubber tired tractors should be reasonably easy to get. Portable crushing plants, in heavy demand by the armed forces, will probably be in moderately good supply, too. Lighter graders are in fairly good supply, but heavy graders are tight. Some scrapers will be hard to get and some makes very difficult to obtain. Asphalt plants, concrete batch plants and pavers will be hard to get. Trenching machinery will be relatively easy. Small items of construction equipment may well be in better than normal supply depending, as all these forecasts do, on fluctuations in military procurement.

If military requirements are not greatly increased, the easing in materials allotments will considerably brighten that outlook for 1952. Construction machinery, as a whole, got 487,654 tons of steel in the first quarter, 1952. It will get 514,541 tons in the second and 564,025 in the third. Slight reductions in copper and aluminum for the second quarter will be more than regained in the third.

DSFA Clears New Construction

With the addition of projects valued at about $28 million approved between Oct. 29, 1951, and Apr. 8, 1952, the Defense Solid Fuels Administration has authorized about $165 million worth of coal mine construction since the start of the defense mobilization program.

Pennsylvania and West Virginia lead the supplementary report with 14 and 11 projects, respectively.

Corrosion Lab Enlarged

Further facilities for the study of sea water corrosion are being added to the Harbor Island Station of the Kure Beach project near Wilmington, N. C. The project is operated by International Nickel Co., but the facilities are available to other companies on a co-operative basis.

Included in the new facilities will be a full-size salt water evaporator and distillation unit to study the effects of water treatment and design on corrosion and scaling of such units—especially as used on ships. Equipment includes a boiler with a capacity of 4000 pounds of steam an hour.

During the 16 years of its existence the Harbor Island project has tested more than 20,000 specimens in sea water, 25,000 in sea atmosphere and a large number in sea spray. The specimens come from more than 100 companies and from the government.

Rubber Barges Into Cargo Business

New portable barge developed by Seiberling Rubber Co., Akron, for the Army transportation corps is powered by two 25-horsepower motors, carries cargo on a deck made of aluminum sections. Compressed air inflates the three rubberized fabric tubes that form a roll 3 by 10 feet for transportation

More Subcontracts To Be Channeled into Hardship Areas

COMING UP are more subcontracts to labor surplus areas.

Many areas of high unemployment due to a drop in demand for civilian goods and reduced materials allotments are without facilities to take on prime defense contracts. An example of such a hardship region is the area including Providence and Attleboro, R. I. Unemployment in this region is largely due to recessions in the textile and jewelry industries. The large jewelry industry is particularly hard-hit by reduced allocations of controlled materials.

To use this area's surplus manpower, the Defense Distressed Areas Task Force recommends that government procurement officials earmark more and more subcontracts to the Providence-Attleboro region whenever possible.

See the accompanying table for selected metalworking contracts awarded by the government in excess of $250,000 in value.

Defense Work Helps Detroit

Unemployment decreased by 17,000 in the Detroit area between February and March, the Defense Distressed Areas Task Force of the DPA reports. Defense contracts totaling about $354 million and a reduction in the labor force accounted for the improved situation in that area.

Prime contract extensions worth nearly $247 million and new prime contracts valued at over $36 million were placed in the area during the month. The remainder was in defense subcontracts.

PRODUCT	CONTRACTOR
Lathes	Consolidated Machine Tool Corp., Rochester, N. Y.
Trucks, 5-Ton	Mack Mfg. Corp., New York
Trucks, Fork Electric	Clark Equipment Co., Battle Creek, Mich.
Cranes	Baldwin-Lima-Hamilton Corp., Eddystone, Pa.
Shells, HE 155 MM	C. A. Dunyam Co., Chicago
Shells, Illuminating, 60 MM	Kwikset Locks Inc., Anaheim, Calif.
Mortar Shells, 60 MM	Lime Material Co., Milwaukee
Boosters, M21A4	Northwest Automatic Products Corp., Minneapolis
Fuzes	Badger Meter Mfg. Co., Milwaukee
	Price-Pfister Brass Mfg. Co., Los Angeles
Cartridge Clips, .30 Cal.	J. L. Clark Mfg. Co., Rockford, Ill.
Tractors	Allis-Chalmers Mfg. Co., Milwaukee
Trigger Guard Assemblies	Willcox & Gibbs Sewing Machine Co., New York
Gasoline Engines	O'Keefe & Merritt, Heavy Equipment Div., Los Angeles
Teletypewriter Sets	National Cash Register Co., Dayton, O.
	Teletype Corp., Chicago
Radio Sets	Motorola Inc., Chicago
Handsets	American Microphone Co., Pasadena, Calif.
Receiver-Transmitter Sets	Lewyt Corp., Brooklyn, N. Y.
Parts for Radio Sets	Hallicrafters Co., Chicago
Communications Equipment	Delco Radio Division, General Motors Corp., Detroit
Generators	Cyclohm Motor Corp., Div., Howard Industries Inc., Chicago
Electron Tubes	Chatham Electronics Corp., Newark, N. J.
Oil Transmitters	U. S. Gauge Division, American Machine & Metals Inc., Moline, Ill.
Carpenter Equipment	Atlantic Hardware & Supply Co., New York

Price Aid on Loss Items

New ruling on price relief for products sold at a loss won't give much help

PRICE RELIEF to a manufacturing industry if, on the average, it produces a particular product or product line at a loss is being provided by Office of Price Stabilization through a "product standard." The relief will be permitted even though the over-all earnings of a particular industry meet the test of the OPS industry earnings standard.

Not So Simple—The product standard, as outlined in Memo 37, requires that the ceiling price for a particular product be high enough to cover the average total cost of producing and distributing that product. However, unreasonable, excessive or improperly allocated costs will be excluded in adjusting ceilings under the new standard.

The new product standard is not expected to be used extensively. The steel companies see nothing in it for them in their current price fight. Possibly sometime in the future they may use it if they're in trouble on some particular product, but now they want a general price hike. Nor will it help many other manufacturers. The ceilings of most products turned out today cover total costs. Because the earning standard guarantees that each industry can receive normal profits on its total operations, many industries needing relief will qualify for price adjustments under the earnings standard before any individual product comes into a loss position.

What's A Product?—The memorandum says the term "product" refers to a general product or line of products rather than to particular sizes, grades, specifications, styles, models or brands. It cites such "product" examples as house-

hold enamels within the paint industry, steel bars within the steel industry.

In determining what a product is, consider: The general understanding of the industry as to what constitutes a product or line of products; and end use; the similarity of specifications and manufacturing processes; the similarity of reactions to common cost increase; the stability of the price relationships among the items; the similarity of types of purchasers and marketing conditions.

Next Step—Where the product is a single standardized item with a uniform ceiling price, unit cost may be compared directly with the ceiling price. BUT, where the product line contains a range of styles, models or other variants, an "aggregate method" is recommended. Under this procedure, the one to be ordinarily followed, aggregate costs in the product line would be obtained from all firms for the previous quarter. These costs would first be adjusted to take account of significant changes in materials prices or wage rates subsequent to the beginning of the accounting period. This aggregate would then be compared with the actual total dollar sales of the commodities in the product line for the quarter, adjusted to the basis of current ceilings.

CHECKLIST ON CONTROLS

Materials Orders

MRO—Amendment of Apr. 16, 1952, of NPA Order M-73 liberalizes controls over maintenance, repair and operating supplies for rail transportation systems. The amendment was effective Apr. 16.

COLLAPSIBLE TUBES — Amendment of Apr. 16, 1952, of NPA Order M-27 removes all restrictions on the use of aluminum from this order. Aluminum will be allocated to manufacturers under the Controlled Materials Plan. Inventories of collapsible tubes will continue to be limited by NPA Regulation 1. Controls remaining in M-27 are limited to tin.

ELECTRIC UTILITIES—Amendment of Apr. 16, 1952, of NPA Order M-50 provides for allotments for minor requirements of controlled materials to electrical utilities for the third quarter of 1952 and advance allotments for the fourth quarter of 1952 and the first two quarters of 1953.

COPPER—Direction 1 to NPA Order M-74 permits the use of copper and copper-base alloys on hand July 1, 1951, in the manufacture of 30 building products (provided the copper and copper-base alloys are still in inventory). Direction 1 was effective Apr. 17, 1952.

MACHINE TOOLS — Amendment of Apr. 18, 1952, of NPA Order M-41 establishes a numerical preference list to govern the priority of machine tool deliveries to defense contractors. The list is a restricted document. The amendment was effective Apr. 18.

STEEL WAREHOUSES — Schedule 3 to NPA Order M-61A prohibits steel distributors from selling more than 500 pounds of any nickel-bearing stainless steel to any consumer in any one month unless the consumer has an authorized controlled material order for the material. The customer must certify that nickel-bearing stainless steel bought from the warehouse will be used only for purposes permitted in NPA Order M-80. Schedule 3 was issued Apr. 23, 1952, and made effective on that date.

Controlled Materials Plan

FLOOD AID—Amendment of Apr. 17, 1952, of Direction 2 to CMP Regulation 6 includes residential buildings in the list of flood-damaged structures whose owners are authorized to obtain materials for reconstruction or repair of damage caused by floods in designated areas of disaster.

PLACEMENT OF ORDERS—Amendment of Apr. 23, 1952, of Direction 3 to CMP Regulation 1 removes restrictions on the portion of an allotment of controlled materials that can be ordered for delivery during the last month of any calendar quarter. The amendment was effective Apr. 23.

Price Regulations

PLATINUM—Ceiling Price Regulation 136 issued Apr. 21, 1952, establishes ceiling prices for platinum and platinum products based on a uniform value of $93 per troy ounce for commercially pure platinum. This is the current General Ceiling Price Regulation price for the dominant sellers in the United States. It is also the world market price for quantity and contract sales through established trade channels. Purpose of CPR 136 is to remove much of the speculative trading and hoarding. Until July 27, 1952, sellers may make shipments at prices up to $105 per ounce. CPR 136 also sets ceiling prices for impure platinum, platinum scrap, ores and concentrates, conversion and manufacturing, and the value of other metals in platinum alloys and scrap. CPR 136 was effective Apr. 26, 1952.

NICKEL ANODES—Ceiling Price Regulation 138 issued Apr. 21, 1952, establishes dollars-and-cents ceiling prices for nickel anodes and for producing anodes from materials owned by others. CPR 138 was effective Apr. 26, 1952.

GEORGE A. STEINER
. . . new DPA policy director

Appointments in Washington

George A. Steiner is the newly appointed director of policy development, Defense Production Authority. He will examine on a long-range basis programs for new weapons and estimate future supplies of materials and components needed to produce them. Mr. Steiner will report to the Defense Production Administration on indicated deficiencies, and will recommend policies and procedures for correcting them.

Mr. Steiner is on leave from the University of Illinois, where he is a professor of economics. Previously he served as director of the Requirements Committee, Defense Production Administration and as the Navy's supervisor of shipbuilding.

Lawrence W. Stratter, administrative vice president of the West Virginia Pulp and Paper Co., was appointed assistant administrator, Chemical, Rubber and Forest Products Bureau, National Production Authority.

Oscar W. Morton, formerly vice president in charge of transmission operations, Panhandle Eastern Pipeline Co., Kansas City, was appointed director of the Gas Operations Division, Petroleum Administration for Defense.

Lyall Tracy, on leave from Rayonier Inc., of Hoquiam, Wash., where he is industrial relations manager, was appointed director of the Pulp, Paper and Paperboard Division, National Production Authority.

Power Write-offs Keep Coming

Rapid write-off was granted 86 more electric power projects, bringing to a total of 261 the applications approved to date. Total cost of the projects thus far approved is $1.8 billion, increasing the power output of the U. S. by 11.6 kilowatts. Weighted average per cent certified by DPA for the projects is 42.9.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Representative Stanley thinks there's far too much beagling by congressional investigating committees . . . What price foreign assistance? . . . An open house for metallurgists . . .

WHEN Rep. Thomas B. Stanley (Dem., Va.) urged Congress to stop wasting time and money on "tomfool" investigations, he voiced a growing Washington sentiment.

The 82nd Congress smashed all records for such beagling. It undertook about 230 separate inquiries since Jan. 3, 1951, and they covered subjects ranging from influnce peddling to contracts of professional baseball players. Investigation costs: About $5 million. And there is duplicating galore: Three different groups investigated the armed forces' single cataloging program.

Net—Results do come from these investigations. That was notably the case when the group headed by Sen. John J. Williams (Rep., Del.) unearthed evidence of widespread corruption in the Internal Revenue Bureau. Plaudits go, too, to the work of the Kefauver committee's broadcasts informing the country of widespread connivance between local political regimes and criminal groups.

In Gross—Bulk of the investigative work, though, has been just so much waste of time and money, thinks Representative Stanley. They cause much delay in carrying on the real work of Congress. Some were disadvantageous to industry. A case in point: The crime committee's televised hearings lifted Senator Kefauver to a national prominence that makes him a leading contender for the Democratic presidential nomination. And from where industry sits, that may not be good. The senator habitually takes a view contrary to that of most businessmen. For one thing, he was one of the leaders in forcing the pigeonholing of the O'Mahoney-McCarran freight absorption bill.

Grand Totals—Recent court decisions tend to dampen the autocratic powers over witnesses that some congressmen seek to wield. Investigating committees aren't helped by that. Of 155 persons cited by the committees for contempt of Congress since 1947, only 43 were convicted, 80 were acquitted, 32 are still awaiting decisions.

Nettled Over Needs

NETTLED over the failure of some industries to supply top-flight men for posts in the National Production Authority, officials of that agency say cooperation from industry will be needed for some considerable time yet.

Not only are there important industry problems still to be solved, say the NPA men, but a working organization must be ready to go to work on full mobilization if there's an allout war.

Needed right now: Industry men to handle problems of getting out more production of heavy steel forgings and castings.

What Price Foreign Aid . . .

Are foreign assistance programs a complete economic loss? To hear some congressmen you'd think they were a total loss. What they neglect to realize is that the bulk of these appropriations are spent for goods produced in the U. S. And they produce much taxable revenue as well as provide much employment.

Should Congress appropriate the full $7.9 billion (economizers are seeking to cut it materially) asked by the President for foreign assistance in fiscal 1953, about $5.5 billion would be spent in the United States for weapons, fuel, machinery, food, etc., to go abroad. This is an approximate figure based on previous experience which shows that approximately three-fifths to three-quarters of the $5.35 billion asked for direct military assistance, and 80 to 85 per cent of the $2.55 billion asked for defense-support and economic assistance, are spent in the United States.

Attention: Metallurgists . . .

Many metallurgists will want to attend the annual "open-house" party of the Division of Metallurgy, National Bureau of Standards, to be held May 12. Dr. J. G. Thompson, director of the division, will introduce six speakers who will read papers covering important research work of the division in the past year. These will cover pure iron, underground corrosion, mechanism of stress corrosion, variables affecting the martensite transformation, deformation twinning in ingot iron at low temperatures and crystal orientation work.

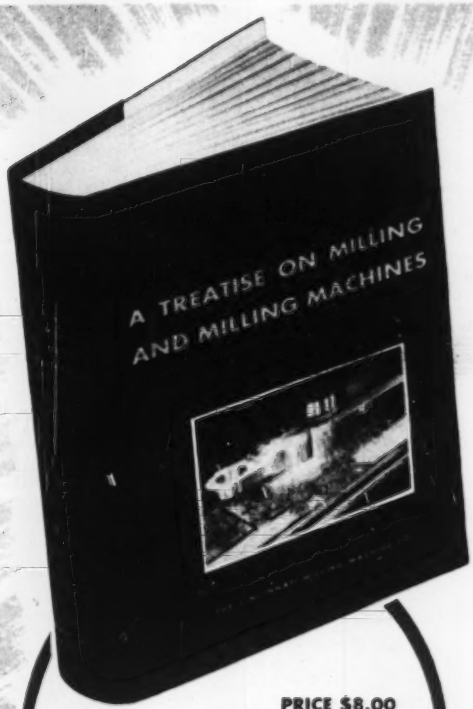
The afternoon will be open to visits at the division's facilities which include a fully equipped foundry and a small rolling mill erected in 1950.

Bulletins, Handbooks, Reports...

How to get more steel production per basic open-hearth furnace is the subject of a new government bulletin available from Office of Technical Services, Commerce Department. Price is 50 cents; order number, PB 106209. It tells four ways of getting greater output.

High-strength aluminum castings are covered in another government report describing work done for the Navy by Cornell Aeronautical Laboratory Inc. It describes a successful induction-heating casting technique, and alloy compositions that give best compression yield, strength and shear strength. It is obtainable from the Library of Congress Photoduplication Service, $1.75 for microfilm, $2.50 for photostat copies; order number, PB 104519.

Fourth edition of General Services Administration's *Handbook of Emergency Defense Activities*, containing defense agency names, addresses, telephone numbers, etc., now is available at 30 cents from Superintendent of Documents, Government Printing Office.



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LUXURY-TYPE GOODS HEAD FOR FOREIGN PORTS
U. S. exports will fall off as other nations restrict imports

Dollar Trade Curbs Reappear Overseas

What's been described as a temporary trend shows foreign countries imposing import restrictions on unessential imports from the dollar countries

AFTER A FLURRY of buying in 1951, many foreign countries this year are tightening the purse strings on their exchange credit balances and slowing down purchases from dollar countries particularly. That's going to make it tougher to sell U.S. goods overseas.

Reaction to the outbreak of hostilities in Korea was a scramble for raw materials; prices went up faster on these than on processed goods. Countries who supplied the raw materials began accumulating foreign exchange credits and in turn began to buy luxury items and hard goods which they had been unable to afford before.

The trouble was they spent or committed more than they were earning. Then, cold war didn't develop into full-scale hot war. Raw material stockpiles went up, prices softened or came down drastically, and in many cases, countries who had surpluses of foreign exchange in the spring of 1951 wound up with deficits.

Reaction to Reaction—In early February, 1952, the Indonesian foreign exchange certificate system was replaced by graded export taxes, limited to "strong" products, and imports were tightened up somewhat. The import of luxury and semiluxury goods is to be discouraged. Latin American countries, such as Argentina, Uruguay, Bolivia, Ecuador and, to a lesser degree, Brazil and Colombia have restricted import of many products (mostly luxury items) which they had been eager earlier to obtain. Even Mexico and Venezuela, which since World War II have not had exchange controls or general import-license systems, have asked their banks to hold down importation through restrictions on commercial credit.

In September, 1951, Belgium announced it was going to screen imports from the United States and Canada and to grant import licenses only for products that were essential and that could not be obtained within the European Payments Union. Italy has waived quantitative restrictions on virtually all products from the EPU area for an indefinite period and has temporarily reduced its duties on most products. Duty reductions apply to imports from all sources. France withdrew a proposal to cut its dollar import program drastically only upon assurance regarding the amount of dollar aid planned for France for the defense effort. At the beginning of 1952, Sweden announced that its dollar import plans for 1952 would have to be cut back.

Across the Board Cuts—And, of course, the sterling area countries have reduced imports to "austerity" levels from soft as well as hard-currency countries. By late March, 1952, Australia, New Zealand, Union of South Africa, Southern Rhodesia and Ireland had announced cuts in their import programs. Singapore and the Malay Federation announced that total dollar imports would be held at 1951 levels, but individual licensing of consumer durable goods for import from all sources shows quotas well below 1951 levels.

How long will that trend toward reduced dollar imports continue? Henry Chalmers, adviser on commercial policy, Office of International Trade, says: "The proposed curtailments in dollar imports for 1952 thus far announced by various European countries and their overseas affiliates seem in most cases distinctly provisional in character, and subject to considerable modification."

Steel Mill Approved for Mexico

Mexico is engaged in increasing its production of steel to 600,000 tons annually within the next two years. Purpose: To provide Mexico's steel from its own industry.

Current production, according to the Mexican Bureau of Statistics of the Department of National Economy, is about 350,000 tons annually. The additional 250,000 tons are to be produced through new machinery and modernization.

Financial support has been pledged, with governmental approval, for what will be Mexico's largest steel mill to be built in the state of Durango, says Enrique Torres Sanchez, governor. Production will be at the rate of 300 tons a day. The plant will be directed by a group of German technicians who arrived in Mexico a short time ago.

Gear blanking die, flanked by two gears at the S. K. Wellman Co. plant in Cleveland

TOMORROW, Apr. 29, the Metal Powder Association holds its annual meeting and metal powder show in Chicago. A scant 30 years ago the age-old industry was given a re-birth. How is it doing today? Here are some of the answers (Cover photo, courtesy Wel-Met Co., Kent, O.)

A 300-ton punch press is used by Wellman for blanking washer and splined cores

Powdered Metals: Old Art, New Science

Powder metallurgy is no panacea for all problems, but the developing science can help you, especially for production of small, intricate parts

By SAM BAKER, Assistant Editor

FIVE THOUSAND YEARS ago the Egyptians made tools of spongy iron by bonding interior surfaces without melting the metal. Today that process—reborn about 30 years ago and embodying the same principle of fusion—is again trying to find its place as a proved fabricating technique.

Powder metallurgy, viewed in toto, hasn't yet lived up to expectations. It is no panacea for all metalworking problems as was all-too-widely proclaimed in early stages of rebirth. For many applications it has nothing to offer. But the industry today is reality.

What It Is—The powder metal process, briefly, consists of mixing and blending talcum-fine granular powders (often with lubricants), briquetting (or compacting with dies at pressures up to 70,000 tons to about one-third the original powder volume), sintering in a controlled atmosphere furnace at a temperature below the melting point and perhaps sizing or re-striking to re-establish tolerances.

Tonnagewise, iron powder use this year will, for the first time, top nonferrous powders. Iron powder is cheaper and about three-fourths of it comes from abroad.

Enthusiasts of the powder metallurgy process admit many parts made with melted metal can't be economically produced in their dies and furnaces. But for many complex parts, some of which can't be made by any other method, powdered metal is the answer. The field of cemented carbides is an oft-mentioned example.

Versatile—It comes as a surprise to many manufacturers to discover the versatility of the process and the range of feasible sizes. Bearings weighing over 300 pounds have been produced; parts or bearings three times that heavy are possible. Most producers confine themselves to a fairly small size range though—where the bulk of present application lies.

Valuable—Largest fabricators of sinterings are captive to the Big Three automakers. Two other sizable shops belong to Lionel Corp. and National Cash Register Corp. Value of the products of the entire metal powder industry (powders, parts and other fabricated items) probably tops $200 million today. Nearly 100 fabricators are in business today.

The industry has an education and selling job to do. Makers of sinterings have two strikes on them competitively: Material costs are sky-high in comparison with melted metal, and costly heavy presses are needed for briquetting.

The Big Equalizer—There's one big equalizer though: Seemingly the more complex a part is the more advantageously it can be made, as many machining operations can often be averted.

PM fabricators say they can compete to varying degrees with any method of precision molding of metal.

Below Capacity—Not all PM producers are operating at full capacity today; for them, defense uses haven't peaked and the consumer goods slump is still being felt. Though much civilian business has been lost, many appliance manufacturers and the like turned to sinterings to get metal parts without using their allocations. Iron powder is an uncontrolled material.

Regaining — Ordnance applications are finally being opened up after early wild enthusiasm over uses in that field almost cost the industry its *entre*. Army Ordnance reports considerable success in its use of iron powder for making rotating bands for hyper-velocity projectiles, though snags still crop up.

In addition to the rotating band program (seven fabricators are now working on it), 50-caliber bullet jackets and a 20-mm practice projectile are being made of iron powder.

Bearings leave a sintering furnace at Wel-Met Co. plant in Kent, O.

Oil impregnation is provided for applications in which self-lubrication is a requirement

Opportunity in Jets—Compressor blades for jet aircraft are in production at Thompson Products Inc., Cleveland, using a process developed by American Electro Metal Corp., Yonkers, N. Y. Gas turbine motors are now produced from one piece of carbide to eliminate the troublesome step of attaching the buckets to the wheel. Carbide tips for armor-piercing projectiles are now being made by General Electric Co.'s Carboloy Department, among others.

Chief use for iron powder is still bearings; sintered parts are second in consumption of powder. Bearings and sinterings take about eight times as much copper as go into friction materials, their closest rival, and almost ten times as much as go into graphite metal brushes. Bearings don't have nearly the growth potential of parts and will probably climb but slowly while parts use skyrockets. According to Amplex Division, Chrysler Corp., "We're just scratching the surface today." B. T. du Pont of National Radiator Co.'s Plastic Metals Division, Johnstown, Pa., believes the proportions will likely change rapidly in favor of dense structural parts till they're the leading tonnage item in the industry. Some observers think ratio of parts to bearings (now about 1 to 2) will be as high as 10 to 1.

Hurdles — Stumbling blocks in the industry's growth have been numerous. One is a common concept that PM parts are fragile. "Education is the greatest crusade needed," says one authority, "to convert designers and engineers to use powder metallurgy from the beginning." Cheaper raw material will be necessary. Metal powders of nearly every kind are plentiful today, but expensive. "A cheap iron powder—a 5 or 6 cent iron powder—would be the biggest boon to the industry possible," says one fabricator. Lack of special equipment hurt the industry in the past; many presses had to be built by the users themselves. Lack of standards and a penchant for secrecy in the industry have been troublesome. Another drawback to progress has been the misconception on the part of many potential users that the sintering process would virtually eliminate all their problems.

High cost of equipment is a big factor in making PM parts. Though all fabricators don't work three shifts a day, the practice is an advantage because furnace temperatures must be accurate and constant. Detroit Sintered Metals Corp.'s M. F. Smith says capital required to start a job shop isn't as great as is commonly thought. That company started on a shoestring and used ingenuity to overcome one of the bugbears of the industry—dies needed to afford flexibility required in a job shop. This company developed adaptors for presses that accommodate comparatively small and low-cost dies. With the average die costs running as high as $2000, production runs have to be high to make the operation economical, W. E. Cairnes, Radio Cores Inc., Oak Lawn, Ill., points out.

Look to the Future—Where are future growth potentialities? According to T. L. Robinson, of Wel-Met Co., Kent, O., and president of the Metal Powder Association, "the biggest potential field ahead lies in little parts, many of which now are small iron castings. In this field greatest savings to users are possible." Small malleable and cast iron castings are now turned out at about a 10-millon ton annual rate. Some PM experts say metal powder could replace one-tenth of that tonnage.

"The bearings and friction materials field is reaching saturation faster than the competitive fields," says M. H. Binstock of Westinghouse Electric Corp.'s East Pittsburgh Powdered Metals Development Laboratory. "Future growth has to come from competition for structural parts."

"In the fields of intermetallic compounds and rare metals, the future is almost unlimited," according to W. L. Havekotte, Firth Sterling Steel & Carbide Corp., Pittsburgh. "Uses for wear parts for high temperature applications and shielding for radiation are just becoming apparent."

Advantage — Accounting for much optimism is one solid factor in PM's favor: Labor costs. In most operations skilled labor is virtually eliminated. Another advantage is that there is virtually no waste or scrap in processing. Furthermore, metal oftimes can be saved by reducing density of the part in areas requiring the least strength. John Miller, Chicago Powdered Metal Products Co., Shiller Park, Ill., says this feature of selective areas of strength will be a big competitive selling point in the future.

To achieve the powder metallurgists' ultimate aims, a vast amount of applied research, development and interchange of information is needed. Necessary above all is a mature evaluation and recognition of the advantages and shortcomings in application as a supplementary or alternate method of fabrication. Thus may powder metallurgy gain full stature as an important and permanent metalworking process.

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NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Cadillac and Henry J prices are cut, but no widespread price cutting on other auto models is yet in sight. An accounting error precipitated the cut on the GM car

DETROIT

RED FACES were in abundance around the Cadillac organization when the Office of Price Stabilization in Washington announced that the GM division's prices had been in error since the 1952 model was introduced, and that it had overcharged buyers about $25 each.

Struggling to swallow their embarrassment and deploring any suggestion that the enforced price cuts might have anything to do with market conditions, Cadillac men explain that it required two reviews of their pricing structure to uncover the accounting error which resulted in this overcharge.

Step Further—When it was discovered, Cadillac went a step beyond that immediately necessary and incorporated in their price reductions an adjustment which they would have made later on because of savings they are realizing since use of conversion steel was abandoned. Their total price-cuts as the result of the two factors ranged from $45 to $71 on the factory delivered prices—not very significant.

Neverthless, Cadillac's reduction was closely followed by Kaiser-Frazer Corp.'s announcement that the Henry J Cosair and Cosair Deluxe were being reduced $168 and $160, respectively, and the Henry J Vagabond series had $100 lopped off its factory delivered prices. Taken together the two actions sounded as though they might be forerunners of a trend.

Strong Position—As far as Cadillac is concerned, it has never had to be less concerned over the strength of the market. Unfilled orders are close to the alltime high of a few months ago. If nobody else bought Cadillacs other than the people who are now driving them, and assuming an ownership-span of about 4 years, the division could continue to have its entire output sewed up.

Auto, Truck Output
U. S. and Canada

	1952	1951
January	409,406	645,688
February	467,885	658,918
March	521,855*	802,737
April		680,281
May		695,896
June		653,682
July		522,858
August		571,442
September		505,758
October		558,971
November		480,199
December		402,729
Total		7,179,161
Week Ended	1952	1951
Mar. 22	125,347	174,953
Mar. 29	132,850	184,514
Apr. 5	125,668	158,076
Apr. 12	123,180	162,839
Apr. 19	127,038	166,502
Apr. 26	128,000*	162,740

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

For K-F the price cut spells out a different story. K-F applied the Capehart amendment's provisions when it brought out its 1952 models and instituted price increases of almost the same magnitude as these reductions. Edgar F. Kaiser, K-F president, in announcing the new prices last Monday, said, "Under the Capehart formula, from a manufacturer's point of view, price increases have been justified. However, in maintaining and improving its competitive position, Kaiser-Frazer has a policy of providing quality, low cost transportation at prices and terms people can afford to pay."

A Matter of Conversion — A Kaiser-Frazer spokesman says that there is no direct relationship between its price reductions and the fact that conversion steel is no longer depended upon in quantity. This will not be true in several other cases. Under OPS CPR 1, Revision 1, Sec. 5, which applies solely to automakers, the use and cost of conversion steel must be taken into account, and price of new passenger cars adjusted accordingly. Apr. 1 was the first reporting date, the automakers having 30 days in which to recompute their costs. If conversion steel was once required and if the savings resulting from nonuse come to more than $10 per car, the ceiling price must be reduced accordingly. This review procedure will be followed every six months.

With very little conversion steel buying going on now by the auto industry, the periodic review provision is probably academic after their initial study. But more reductions on the order of Cadillac's can certainly be expected.

A Matter of Sales—K-F's move to strengthen its competitive position may or may not begin a trend. Sluggish auto sales, it is believed in many quarters, can be overcome by good hard effort on the part of dealers—and the abandonment or relaxation of Regulation W on credit terms. That ruling becomes more onerous every day that the spring selling season is on. Many makes of cars are not responding. At the same time, however, the salutary effect of price-cutting is not being overlooked for an instant by the industry.

Several makers now appear to be bumping up against a sales ceiling which is unrelated to NPA's production ceiling.

Ford Wants More of the Pie

Though sales leave much to be desired, there is no reason to think that most of the automakers are not planning to challenge Ford's appeal for a bigger share of the production pie. NPA will have a large-scale fight on its hands when the hearings begin Tuesday, May 6. Only General Motors can sit back calmly and watch the fireworks. Ford has not suggested that GM's quota be altered, except upward.

Ford's proposal would also give Chrysler a slightly larger chunk of the industry's production, but would displace that company from its No. 2 position in favor of Ford.

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In answer to this suggestion Chrysler prepared a brief almost as long as Ford's original, which item by item and piece by piece picked apart Ford's claim to the higher industry position.

Chrysler asserted that Ford's choice of base period, the year ended June 30, 1950, is not unnaturally the one most favorable to itself. In that year, during the latter part of 1949, a 40-day steel strike hurt other producers more than Ford because of Ford's ownership of a steel mill which produced about half of its requirements. During the first half of 1950, Chrysler was strikebound 103 days.

Chrysler hits Ford hard, and swings on NPA also, saying (and backing the charge up with statistics): "NPA has already assigned to Ford a higher position relative to Chrysler than Ford itself has achieved in any of the past 17 years and higher than Ford actually has now." Ford's proposition, would create "for itself under government controls a standing in the industry that its own efforts have not brought it. No government order should confer on Ford a position it did not reach in a free competitive economy."

Citing "the arbitrary and unfair advantage for Ford that NPA Order M-68 created" and the further injustice done when current quotas were set on Feb. 6 in recognition of what NPA called a trend in first quarter, 1951, Chrysler intimates that Ford has consistently received a better break at NPA's hands than it has been entitled to.

Its claims for a greater share of truck production, says Chrysler, "are even more unjustified and far fetched than its claims in the passenger car field." In the 1947-49 base period, says Chrysler, Ford's light-truck output was 20.02 per cent of industry. NPA allotted it 21.03. Ford would claim 26.67. Dodge earned 13.5 per cent in the base. It is allotted 13.44, and Ford proposed cutting Dodge to 13.23. It is the same story in the medium and heavy truck fields. "The authority," says Chrysler, "has allotted to Dodge less than Dodge earned in the base period, and has allotted to Ford and General Motors more than they have earned in the base period. If the appeals board changes the authority's allotments, we insist that it restore Dodge and its principal competitors to the relative standings they earned in free competitive circumstances."

The conclusion reached in Chrysler's brief is that Ford's appeal ought to be dismissed "or in the alternative assign to the major car and truck makers the shares of the industries they actually earned in the base period, with no adjustments except those that the special circumstances of some smaller-volume producers may call for, and these should be on a proportionate basis."

Vision of Things To Come

Clay in the hands of an expert can become a thing of beauty as this Chrysler Corp. craftsman demonstrates. He is working on a model of the company's new experimental C-200 which was displayed at the Parade of Stars Automobile Show in New York. Conceived and designed in Chrysler's Detroit styling studios, the model, scale drawings, engine and chassis were shipped to a custom body builder, Ghia, in Turin, Italy, where the body was built and the car assembled

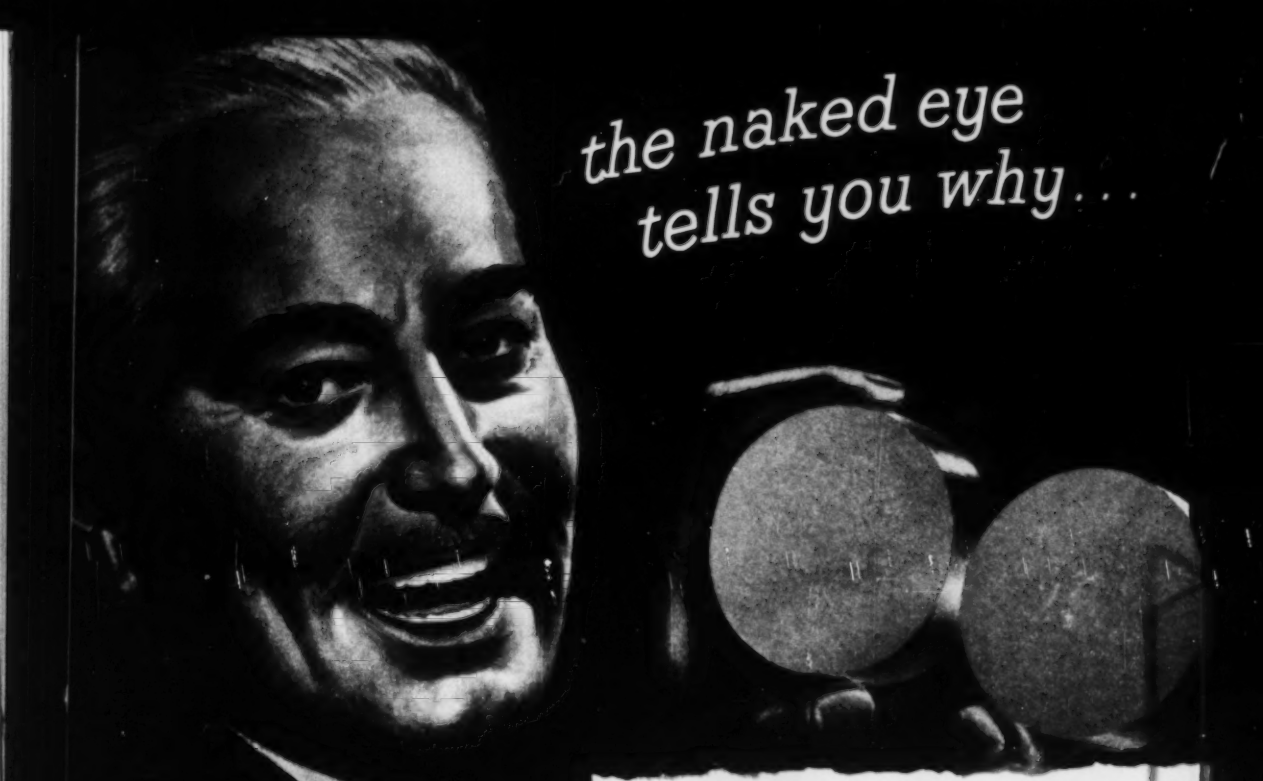
In Last Lap: Horsepower Race

Motordom's horsepower race is in its last lap, and Cadillac and Chrysler will go under the wire in a photo finish. Both will kick their "advertised" horsepowers up a few notches in the final sprint, but that will end it as far as they are concerned—at least until highways catch up with the progress they have made.

Public reaction is calling the halt. Letters are being received by these two automakers with embarrassing frequency asking, in effect, "Isn't the highway death rate high enough without your putting more power in drivers' hands?"

Good Reason—There are good sound reasons for increasing the capabilities of automotive engines. The outstanding one is the better performance which such engines have at normal driving speed. Much can be said for the ability of these new cars to get their drivers out of tight spots. And the flexibility they have in traffic cannot be discounted.

The sales appeal of the higher horsepower engines is one of the not-so-sound reasons for their development. For every person who says "180 (or 190) horsepower, that's for me," there are perhaps dozens who say "What do I need that kind of power for." You can already notice in the advertising copy for these two cars that their once-strong sales point is being played down. Emphasis is on safety and quality. In personal selling, power of the engines can be used effectively when the prospect is receptive to that particular appeal, soft-pedalled when the salesman sees it doesn't go over.



"DESEGATIZED" HI CARBON — HI CHROMIUM *die steels are the BEST*

Compare the actual photographs (above) of random-cut hardened, polished and etched samples—"DESEGATIZED" Steel on the left; the average standard process steel, on the right. Note the full uniformity of the "DESEGATIZED" steel—no harmful carbide concentrations are present!

This means that when you specify "DESEGATIZED" Hi Carbon—Hi Chromium Die steels, you get

- ease of die machining
- minimum heat treating hazard
- extra toughness
- superior die performance

Production economy demands the best die performance! Select the best steel for your next die job—one of the "DESEGATIZED" Hi Carbon-Hi Chromium die steels!

See the difference with your naked eye—take advantage of another Latrobe service—Inspection Discs cut from the bars making up your mill order for "DESEGATIZED" High Carbon-High Chromium Die Steels.

SEND FOR THIS BOOKLET TODAY!

LATROBE ELECTRIC STEEL CO., LATROBE, PA.

Yes! I am interested in your metallurgical Inspection Disc service. Send booklet at once.

NAME .....

POSITION .....

COMPANY .....

STREET .....

CITY ..... ZONE ..... STATE .....

LATROBE ELECTRIC STEEL COMPANY

LATROBE PA.

Branch Offices and Warehouses BOSTON BUFFALO CHICAGO CLEVELAND DAYTON DETROIT HARTFORD LOS ANGELES MILWAUKEE NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS TOLEDO

Sales Agents DALLAS DENVER HOUSTON MINNEAPOLIS SEATTLE WICHITA

Like to add this storage space... for free?

You can . . . easily, too . . . by efficiently using the services of your *industrial distributor*.

His stock (most of the things you need) can be *your* stock, almost as quick as a phone call. This handy source of supply makes large inventories needless . . . helps you convert a lot of storage space into extra production space. If anyone can get hard-to-get items, he can . . . through his close contacts with manufacturers and other wholesalers.

His knowledge of products and engineering techniques, both tried and new, is yours for the asking . . . from suggestions on substitutes for scarce items to emergency aid in supplying a vital part or piece of information to keep production running smoothly.

You'll also save purchasing time and paper work by dealing with one, or a few, industrial distributors rather than scores of suppliers.

Your industrial supply distributor is in business to serve your business. Use him . . . you'll find it profitable to do so.

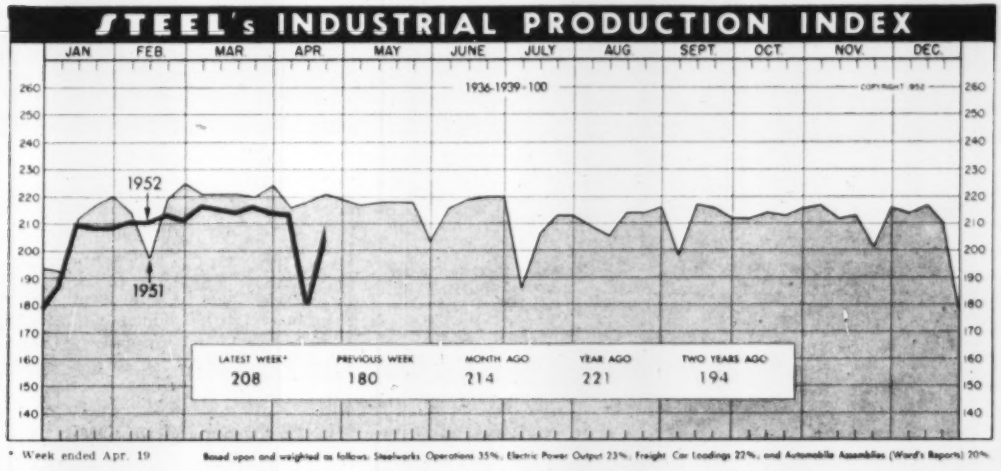
RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Dallas, Oakland. Sales agents at: Portland, Seattle. Distributors from coast to coast.

RB&W
THE COMPLETE QUALITY LINE

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

The Business Trend



* Week ended Apr. 19 Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%, and Automobile Assemblies (Ward's Reports) 20%.

Activity index continues its recovery from the steel work stoppage. Fears of another round of other industry-wide strikes cloud the business scene

AS APRIL comes to an end, predictions that we are in for favorable business weather ahead are being tempered with some big "ifs."

Clouds — Right now, industrial machinery is running at a good clip. Defense orders are taking up some of the slack in civilian production and increases in expenditures for new plants and equipment point to perhaps an even higher output. But certain factors put some clouds into the industrial picture.

Top item on the list is the threat of a series of industry strikes. Metalworking executives are watching the steel situation with considerable apprehension. Who will be next in line for an industry strike and possible government seizure? Aluminum companies — tied up with the CIO—may soon be in for the famed Truman Treatment. Labor leaders are waiting to see the results of the steel situation before they make a move. The silence on the nation's labor front is deafening.

Fearful—Another threat to high business activity is the lag in civilian demand for goods. Some of the consumers are fearful of what the near future may bring. They are inclined to be a little more conservative in their purchases as long as they face layoffs from strikes. So the labor unrest is really being felt by manufacturers all along the line.

Manufacturers and consumers are both waiting to see if the Truman-Murray Sword of Damocles will fall on the nation's economy.

Index Recovering Loss . . .

Reflecting a quick recovery from the drop in steel operations just prior to the government seizure of the industry, STEEL's industrial production index shot up 28 points to 208 per cent of the 1936-1939 average in the week ended Apr. 19. Following the rise in steel production, freight car loadings and electric energy recovered some of their lost ground. Auto output also gained over the previous week, but that was due to a longer workweek.

High Output Returns . . .

Steel mills are nearing their high output levels again. The American Iron & Steel Institute estimates that 2,085,000 net tons of steel for ingots and castings were turned out in the week ended Apr. 26. That's a rise of 47,000 tons from the previous week, but still below the month-ago output by 56,000 tons.

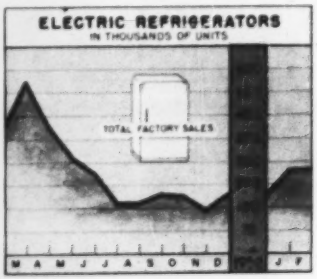
Shifting Into Second . . .

Sticking close to assembly schedules, automakers are edging up production rates. In the week ended Apr. 19, U. S. and Canadian manufacturers turned out 127,038 passenger cars and trucks, says *Ward's Automotive Reports*. That's an increase of 3858 units from the output in the previous week, when Good Friday observances caused a slight production dip.

Now that steel, copper and aluminum are apparently in improved supply, *Ward's* estimates that 4.3 million passenger cars will be turned out by U. S. plants in 1952. That's 1 million units below the 1951 output.

Savings Pile Higher . . .

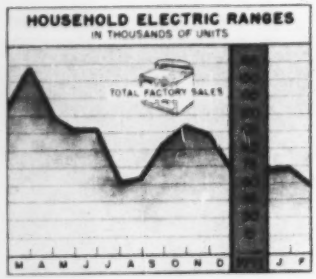
Confirming reports from the nation's manufacturers and retailers, the Securities & Exchange Commission says individuals in 1951 saved in liquid form nearly as much as the total saved during the four previous years. Last year



Electric Refrigerators
Total Factory Sales—Units

	1952	1951	1950
Jan.	275,297	465,903	375,856
Feb.	277,986	403,035	461,256
Mar.		558,563	586,293
Apr.		409,887	546,279
May		309,722	542,865
June		261,298	549,740
July		163,922	507,929
Aug.		165,309	518,359
Sept.		193,929	535,092
Oct.		191,519	420,431
Nov.		147,394	411,291
Dec.		195,403	394,268
Total		3,465,824	5,848,579

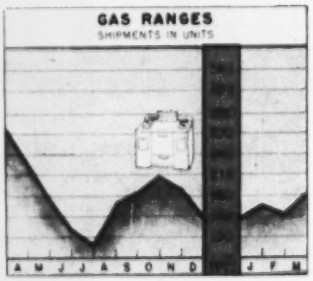
National Electrical Mfrs. Assoc.



Household Electric Ranges
Total Factory Sales—Units

	1952	1951	1950
Jan.	72,830	130,316	97,925
Feb.	55,728	121,585	118,989
Mar.		159,865	145,417
Apr.		118,823	132,859
May		106,885	145,498
June		106,589	138,534
July		60,530	130,505
Aug.		64,042	132,243
Sept.		93,551	156,216
Oct.		109,043	130,452
Nov.		101,476	129,384
Dec.		72,140	124,360
Total		1,244,645	1,602,382

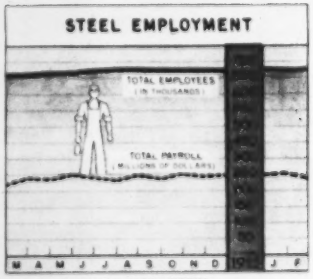
National Electrical Mfrs. Assoc.



Gas Ranges
Shipments in Units

	1952	1951	1950
Jan.	166,100	260,600	165,000
Feb.	150,400	254,000	209,000
Mar.	180,100	289,800	264,000
Apr.		225,000	239,100
May		177,800	242,800
June		128,500	217,000
July		116,400	254,800
Aug.		168,100	331,500
Sept.		183,600	287,000
Oct.		210,900	308,000
Nov.		192,200	269,100
Dec.		145,800	235,900
Total		2,348,900	3,023,200

Gas Appliance Mfrs. Assoc.



Steel Employment, Payrolls

	Employees† in Thousands		Payrolls in Millions	
	1952	1951	1952	1951
Jan.	672	657	$252.2	$248.3
Feb.	674	663	234.9	219.4
Mar.		663		238.3
Apr.		666		234.8
May		667		249.0
June		674		240.7
July		678		231.9
Aug.		679		247.7
Sept.		677		236.3
Oct.		674		249.9
Nov.		675		242.0
Dec.		675		246.7

† Monthly average. American Iron & Steel Institute.

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Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction	Mar. 31	Gray Iron Castings	Apr. 14	Radio, TV	Mar. 24
Durable Goods	Mar. 31	Ironers	Jan. 21	Steel Castings	Apr. 14
Employ., Metalwkg.	Apr. 21	Indus. Production	Apr. 21	Steel Forgings	Apr. 7
Fab. Struc. Steel	Apr. 7	Machine Tools	Mar. 10	Steel Shipments	Apr. 21
Foundry Equip.	Apr. 14	Malleable Castings	Apr. 14	Vacuum Cleaners	Mar. 24
Freight Cars	Apr. 21	Prices	Feb. 18	Wages, Metalwkg.	Jan. 28
Furnaces, Indus.	Mar. 31	Pumps	Mar. 31	Washers	Apr. 7
Gear Sales	Apr. 7	Purchasing Power	Mar. 3	Water Heaters	Mar. 24

people stashed away $13 billion, three-fourths of it in the last six months of the year—when the post-Korea buying wave had halted.

Individual holdings of bank deposits, cash, insurance and securities rose sharply; net purchases of corporate securities in 1951 were higher than in any year since 1929.

While liquid savings rose, savings in physical form—housing and durable consumer goods—dropped below the 1950 levels. Investment in nonfarm dwellings dropped to $11.5 billion, $1 billion under the 1950 total. And liquidation of mortgage debt followed the decline in construction by dropping the same amount to $6 billion in 1951. Investment in consumer durables over the year fell $2.4 billion to $26.8 billion.

Homebuilding Reaching Up . . .

Contractors and architects are able to take on more private housing jobs now that materials are easing. And the demand for new homes is keeping pace. A total of 98,000 new permanent nonfarm dwelling units were started during March, says the Labor Department. That's a record for the month, if you except the high for the month in March, 1950.

As the warm weather arrives, new housing awards continue at high levels. Awards for private housing led all other construction categories by totaling $47.5 million for the week ended Apr. 10, says *Engineering News-Record*. Private housing awards in 1952 to date are running 38 per cent above the 1951 amount. While private housing was experiencing a boom, awards for industrial construction dropped to $41.1 million that week, 50 per cent below the average 1952 week.

No Vacuum in Sales . . .

While most appliance manufacturers find sales well below those during the consumer spending spree in March last year, that's not true of makers of vacuum cleaners. Factory sales of standard-size vacuum cleaners in March totaled 290,092 units, says C. G. Frantz, secretary-treasurer of the Vacuum Cleaner Manufacturers' Association. Sales in March were

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	96.5	61.5	103.0
Electric Power Distributed (million kwhr)	7,120	7,154	6,730
Bituminous Coal Output (daily av.—1000 tons)	1,363	1,357	1,661
Petroleum Production (daily av.—1000 bbl)	6,300[1]	6,366	6,143
Construction Volume (ENR—millions)	$235.1	$228.5	$220.8
Automobile, Truck Output (Ward's—units)	127,038	123,180	166,502
TRADE			
Freight Car Loadings (unit—1000 cars)	700[1]	691	809
Business Failures (Dun & Bradstreet, number)	188	184	151
Currency in Circulation (millions)[3]	$28,436	$28,526	$27,157
Dept. Store Sales (changes from year ago)[3]	+11%	+8%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$16,168	$16,477	$16,664
Federal Gross Debt (billions)	$257.5	$257.3	$254.7
Bond Volume, NYSE (millions)	$14.2	$11.0	*$16.0
Stocks Sales, NYSE (thousands of shares)	8,102	4,939	7,820
Loans and Investments (billions)[4]	$72.9	$73.1	$69.7
United States Gov't. Obligations Held (billions)[4]	$31.0	$31.2	$30.7
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92	171.92	171.92
STEEL's Nonferrous Metal Price Index[6]	243.6	243.6	246.2
All Commodities[7]	111.5	111.6	115.0
All Commodities Other Than Farm and Foods[7]	113.2	113.2	116.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

practically identical with the 290,242 units sold in March, 1951.

Tight Reins on Consumers . . .

While manufacturers of consumer durable goods are suffering from a sales-lag, reports come from Washington that the government may wait in suspending controls over consumer installment buying. So says an unidentified Federal Reserve Board official, following rumors that the board may suspend the curbs. Word has it that the restrictions may be suspended as soon as the board sees what Congress does to its control powers in acting on the Defense Production Act which expires June 30. The board fears that if it ends installment curbs now, Congress may not restore those powers if it extends the controls law.

Meanwhile the installment curbs require an individual to put down one-third of the purchase price on autos and 15 per cent on most other consumer items. Under present regulations, payments have to be completed within 18 months.

Loans to Industry Drop . . .

The first weekly decline in loans to metalworking companies since April, 1951, was reported by the Federal Reserve Board. Repayments on loans by metalworking companies dropped $14.9 million in the week ended Apr. 9. About two-thirds of the decline occurred in the Chicago area. Manufacturers of metals and metal products repaid $939 million on loans between Dec. 26, 1951, and Apr. 9, 1952.

Failures Soar . . .

Business failures in March totaled 715, the highest since May, 1951. They numbered more than 16 per cent above the February failures, but 2 per cent under March, 1951, says Dun & Bradstreet Inc.

Trends Fore and Aft . . .

Wholesale prices declined 0.2 per cent from February to March. In the week ended Apr. 15, all commodities dropped 0.1 per cent . . . Stocks of domestic and foreign crude petroleum totaled 258 million barrels on Apr. 5. That's 5 million above the previous week's supplies . . . Shipments of gas-fired central heating equipment in the first quarter totaled 170,200 units, a drop of 58,200 from shipments during the same period in 1951 . . . No over-the-year gain in nonfarm employment in March.

Even the smallest size Reamers are Standard with L&I

The Reamer Specialists
LAVALLEE & IDE, INC.
CHICOPEE, MASS.

5 METALS IN PRECISION-MADE REEL MACHINED WITH ONE SUNICUT OIL

The Ocean City Manufacturing Company operates Brown & Sharpe automatics on free-turning brass, aluminum, cold-rolled steel, phosphor and hardware bronze. Having used Sunicut Cutting Oils since 1941 with complete satisfaction, the plant decided a year ago to find out what other products could do. Numerous competitive oils were tested, and the best was selected for a long trial run.

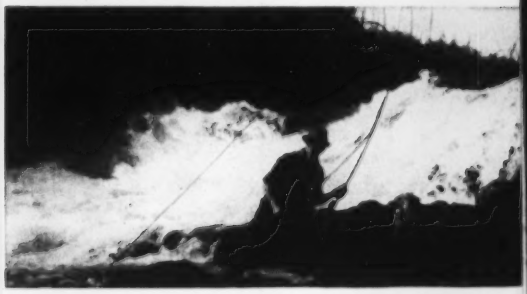
But this oil did not prove satisfactory in actual use. It caused the gibs to corrode and the slides to stick. Operators found miking difficult. Downtime and rejects grew to disturbing proportions. Finally, to protect its automatics and restore its production efficiency, the plant decided to go back to Sunicut Cutting Oils and standardized on Sunicut 11.

Sunicut 11 is a "Job Proved," dual-purpose cutting oil for automatic screw machines. Its transparency permits quick and accurate miking. Among its virtues is the fact it will not stain brass. It drains rapidly, minimizing carry-off. And its high lubricating and cooling properties aid in prolonging tool life and improving finishes. Moreover, it protects finished parts from rust and corrosion. For other outstanding cutting oil case histories write for booklet S-12.

MACHINE: Brown & Sharpe No. 20 • **METAL:** 11 ST aluminum
OPERATIONS: Feed stock, center drill, counterbore, recess and countersink, tap, form and cut off • **SFPM:** 800 • **SPEED:** 3,150 rpm
PRODUCTION: 250 collar housings per hr. • **CUTTING OIL:** Sunicut 11

MACHINING PARTS for Ocean City's "90" Automatic Reel, Sunicut 11 does not corrode the bronze gibs of the automatics, minimizes carry-off, makes miking easy. A coolant tried as an "economical" replacement failed on all three counts.

THIS AUTOMATIC REEL contains six types of metals . . . free-turning brass, aluminum, cold-rolled and stainless steel, phosphor and hardware bronze. Another Sunicut grade is used on the stainless steel.



THE PRECISION PARTS that Sunicut 11 helps to make possible are put to the test as this top-quality reel goes into action. Little does the fisherman know how much of his pleasure he owes to a cutting oil.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO

Men of Industry

ARTHUR L. FLECK
. . . American Screw V.P.-sales

JOHN J. COY
. . . American Screw gen. sales mgr.

Arthur L. Fleck was elected vice president of sales, and **John J. Coy** was named general sales manager of **American Screw Co.**, Willimantic, Conn.

W. H. Garrison was elected treasurer of **E. W. Bliss Co.**, Canton, O. Associated with the company for a number of years, he most recently served as assistant treasurer. **Miss Dorcas Alker** was appointed assistant secretary, with office in New York.

L. B. Perkins was elected vice president and treasurer, **D. A. Stuart Oil Co. Ltd.**, Chicago, and was also made general manager.

Kenneth G. Hubach was appointed sales manager of the foundry and commercial weldment departments of **Baldwin-Lima-Hamilton Corp.**, Philadelphia. He left H. L. Yoh Co. in 1951 to join B-L-H as manager of its commercial weldment division.

R. H. Kitzman, vice president and manager of the Toledo, O., plants of **Doehler-Jarvis Corp.**, was appointed general production manager of that organization. Other appointments at the Toledo plant include: **Clinton Anderson**, promoted to works manager; **Paul E. Wallett**, advanced from superintendent of inspection to production superintendent replacing Mr. Anderson; **Henry L. Byrne**, named superintendent of inspection; and **Edward A. Metzger**, appointed assistant labor relations director.

John F. Allen was appointed manager, Allen Extrusion Machinery Division, **Industrial Ovens Inc.**, Cleveland. He heads a new plastic and rubber insulation machine subdivision of the company. **M. F. Schreurs** was named manager of the new coating Research and Development Laboratory, Toledo, O.

R. J. Foresman was elected vice president and general sales manager, **Mid-West Abrasive Co.**, Owosso, Mich. He will be in charge of sales, service engineering and advertising departments.

Worley Stapleton was promoted to superintendent in charge of production at the Greenville, Tex., division of **Temco Aircraft Corp.** **R. P. Crawford** was named assistant chief inspector there.

R. M. Clemans, formerly Wheeling district sales manager, **Wheeling Steel Corp.**, Wheeling, W. Va., was appointed manager of secondary sales to succeed the late **H. G. Sommer**. **V. C. Dollman**, formerly Pacific Coast sales manager, becomes Wheeling district sales manager. **C. S. Larsen**, formerly assistant manager, New York district sales, becomes Pacific Coast sales manager. **C. E. Bates Jr.** was appointed assistant manager, metal decorating sales division.

John R. Millikin was made office manager, Pittsburgh branch, **Crucible Steel Co. of America.**

N. J. Kassnel was appointed vice president in charge of engineering, **Verson Allsteel Press Co.**, Chicago. He has been associated with Verson for ten years in capacities of

KENNETH G. HUBACH
. . . a sales mgr. for B-L-H

JOHN F. ALLEN
. . . div. mgr. at Industrial Ovens

N. J. KASSNEL
. . . Verson Allsteel V.P.-engineering

designer, chief draftsman and chief engineer. **Paul Kjelstrom** was named chief engineer; **Chris Zeilenga**, chief engineer for research and development; and **Henry DeMatteo**, assistant works manager.

H. J. L. Cotton was named technical co-ordinator, **Sherwin-Williams Co.**, Cleveland, responsible for general supervision of technical department activities in the fields of industrial products finishes and transportation finishes. **H. E. Spitzer** was appointed director of development, supervising paint, varnish and lacquer development laboratories at Chicago.

Kaiser Steel Corp., Oakland, Calif., appointed **Jack Webber** district sales manager for its new midwest sales district, with headquarters in Tulsa, Okla. **T. H. Wakeman** replaces **L. G. Johnson**, resigned, as sales representative in Houston.

Charles F. Moore Jr. was appointed as a member of the administration committee of **Ford Motor Co.**, Dearborn, Mich. In this newly created position he will be in charge of all public relations activities of the company.

Jet Combustion Inc., Chicago, elected **Richard Smith** president to succeed the late **John E. Tegarden**, president and founder. **Mrs. John E. Tegarden** was named executive vice president; **Richard Kelly**, vice president of engineering; **Steve Kupres**, vice president of field operations; and **Clyde Tegarden**, secretary and treasurer.

Three executives of **Aluminum Co. of America**, Pittsburgh, elected to newly created vice presidencies are: **Gordon W. Cameron**, treasurer since 1943, who becomes vice president and treasurer; **Arthur P. Hall**, director of public relations and advertising, who becomes vice president in charge of those fields; and **C. F. Nagel Jr.**, chief metallurgist, who assumes the third new vice presidential post.

Elbert H. Neese, president, **Beloit Iron Works**, Beloit, Wis., was advanced to chairman of the board and is succeeded as president by **Harry C. Moore**, a vice president since 1941.

ALVA L. CREMEAN
. . . V. P.-mfg., Bunting Brass & Bronze

Alva L. Cremean was appointed vice president in charge of manufacturing, **Bunting Brass & Bronze Co.**, Toledo, O. Associated with the company since 1935, he became plant manager July, 1951.

C. H. Foulkrod was appointed works manager, **Quaker Rubber Corp.**, division of H. K. Porter Co. Inc., Philadelphia. He has been plant superintendent.

William B. McGorum, formerly district sales manager, ACF-Brill Motors Co., was promoted to sales manager of the company's **Hall-Scott Motor Division**, Berkeley, Calif.

James Flett Organization Inc., Chicago, named **G. E. Franks** as manager of its Chicago branch office.

David Round & Son, Cleveland, appointed **Hollister G. Fergus** general sales manager. Formerly Chicago district sales manager, Mr. Fergus succeeds **William J. McSherry**, now operating as a manufacturers' representative in Ohio, Michigan, western Pennsylvania and New York.

HOLLISTER G. FERGUS
. . . David Round gen. sales mgr.

Morse G. Dial was elected president, **Union Carbide & Carbon Corp.**, New York, to succeed **Fred H. Haggerson**, who continues as chairman of the board. Mr. Dial has been executive vice president since 1951. **Kenneth H. Hannan** was elected treasurer. He became secretary and assistant treasurer in 1949. **Walter E. Remmers** was elected vice president, alloys division. He has been president of Electro Metallurgical Co. since 1948, and president of United States Vanadium Co. since 1950, both of which are divisions of Union Carbide & Carbon.

Herbert J. Heesch was made field sales supervisor of **Hooker Electrochemical Co.**, responsible for coordinating activities of field salesmen and district sales managers. He will have headquarters at Niagara Falls, N. Y.

William T. Harris, employed by **York Corp.** since 1936, was named assistant to the district commercial sales manager of the air conditioning and refrigeration firm's southern district, with headquarters in Atlanta.

Additional members elected to the board of directors of **Cummins Engine Co. Inc.**, Columbus, Ind., are **L. W. Beck**, vice president of sales, **D. J. Cummins**, vice president of engineering, and **W. M. Harrison**, vice president and treasurer.

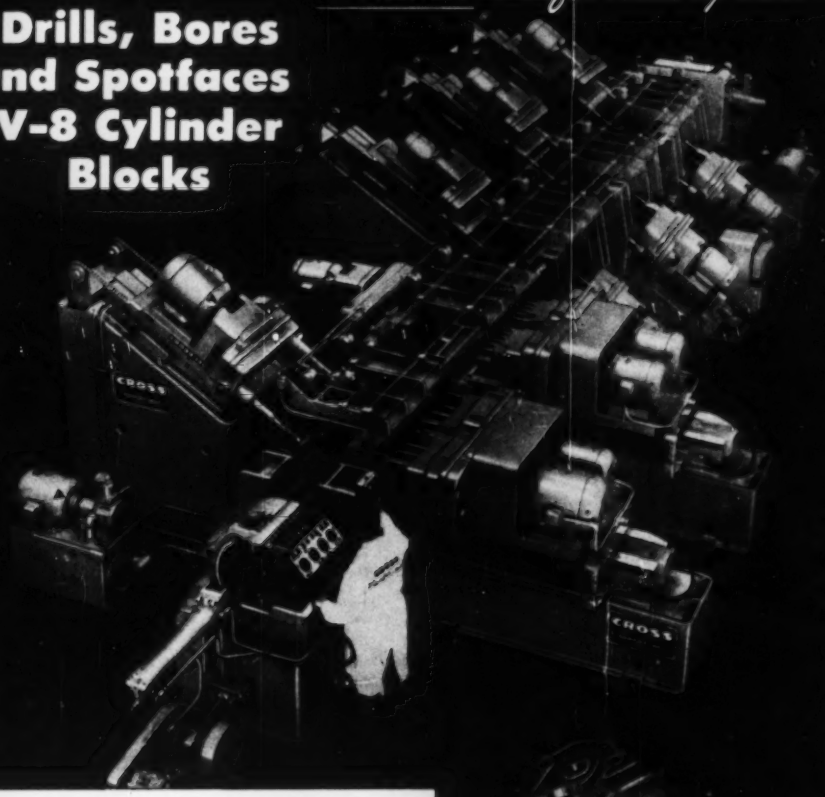
Soule Steel Co., San Francisco, named **Edward L. Soule Jr.** vice president and general manager. He was formerly West Coast production manager.

Gen. Levin H. Campbell Jr., who retired Mar. 1 as executive vice president of International Harvester Co., was elected a director of **Curtiss-Wright Corp.**, New York. He will serve as a special consultant to Roy T. Hurley, chairman and president.

George T. Keller was appointed manager, customer service department, **Pacific Airmotive Corp.**, Burbank, Calif. He served for 12 years with Pratt & Whitney Aircraft Di-

Another Transfer-matic by Cross

Drills, Bores and Spotfaces V-8 Cylinder Blocks



- ★ Drills, bores, spotfaces and reams 120 V-8 cylinder blocks per hour at 100% efficiency.
- ★ 19 stations—one for loading; ten for drilling, boring, reaming, countersinking and spotfacing; two for gaging; one for cleaning; four idle; one for unloading.
- ★ J.I.C. standard hydraulic and electrical construction with stranded wire.
- ★ Hydraulic locating, clamping, positioning and transferring.
- ★ Cross Machine Control unit to automatically stop machine when tools need changing.
- ★ Pre-set tools.

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JUDSON C. TRAVIS
. . . V. P.-gen. mgr., Handy & Harman

F. A. MILLER
. . . sales co-ordinator, Gould Batteries

FULTON MONSEES
. . . Convair purchasing agent

vision, United Aircraft Corp., and in 1951 joined Southwest Airmotive Corp., Dallas.

Judson C. Travis was elected vice president and general manager, **Handy & Harman**, New York, refiner and fabricator of precious metals. In addition he will be responsible for all accounting and financial departments. **Frank C. Jones**, Bridgeport, Conn., plant manager, was elected vice president in charge of production. **Thomas H. Gallagher**, managing director and treasurer of the subsidiary, Handy & Harman of Canada Ltd., was elected to the board of directors. **F. H. Wemple** was elected assistant secretary.

Huck Mfg. Co., Detroit, promoted **Robert Looker** to sales manager and appointed **Donald Stamy**, formerly an engineer with Chrysler Corp., as assistant sales manager.

Gould-National Batteries Inc.'s industrial division has revised its sales forces in eastern, midwestern and Pacific territories. **F. A. Miller**, former New York regional sales manager, was elevated to coordinator of sales at Trenton, N. J., headquarters, and **Frank Keenan** of the headquarters sales staff was promoted to its managership. Pittsburgh and Detroit territories, hitherto administered by the Cleveland regional office, become bases for regional sales offices May 1. **O. W. Rider**, former Cleveland district manager, becomes Pittsburgh regional manager, and **John P. Kelly** will manage the Detroit regional office.

Robert M. Whitney was promoted to sales manager, **Automatic Transportation Co.**, Chicago. He joined the firm in 1936 and since 1948 has been advertising manager.

Fulton Monsees was appointed purchasing agent, **Consolidated Vultee Aircraft Corp.'s** San Diego, Calif., division. He has been staff assistant to H. N. May, chief of materials, since October, 1951, and replaces **J. C. Buchan**, named supervisor of material control.

John F. Byrom was appointed sales engineer, railway division, at the Minneapolis office of **Timken Roller Bearing Co.**

A. J. Holloway was appointed works manager for **Lawndale Enameling Co.**, Chicago. He formerly was associated with Ferro Enamel Corp. and in 1949 joined George D. Roper Corp. in charge of porcelain enameling operations.

Joseph K. Decker was appointed assistant director of purchases at **AC Spark Plug Division**, General Motors Corp., Detroit.

OBITUARIES . . .

William Wallace Scott Jr., 71, vice president in charge of sales and a director of **Laclede Steel Co.**, St. Louis, died Apr. 16.

Fred R. Daniels, 65, advertising manager, **Waterbury Farrel & Machine Co.**, Waterbury, Conn., died Apr. 7.

John A. Morrissey, 58, founder and president, **Chicago Rivet & Machine Co.**, Chicago, died Apr. 18.

John F. Rockelmann, 64, founder and president, **American Boiler & Tank Co.**, Chicago, died Apr. 17.

James F. Knudson Jr., former director of sales engineering, **Acme Pattern & Machine Co.**, Buffalo, died Apr. 18.

John J. Lenahan, 76, president, **Excelsior Steel Ball Co. Inc.**, Tonawanda, N. Y., and president of Frank Lenahan & Sons Inc., Buffalo, scrap dealer, died Apr. 17.

Edward W. Tait, 65, manager, fabricated products department, **Combustion Engineering-Superheater Inc.**, New York, died Apr. 12.

C. Denton Slaughter, 67, assistant general sales manager, **Anaconda Wire & Cable Co.**, New York, died Apr. 15.

Morris Perell, 69, former president, **National Sheet Steel Co.**, Detroit, and chairman of the board of **Lion Steel Co.**, died Apr. 13 in Florida.

Roger E. Fish, superintendent, machine division, **Erie Forge & Steel Co.**, Erie, Pa., died Apr. 12 of a heart attack.

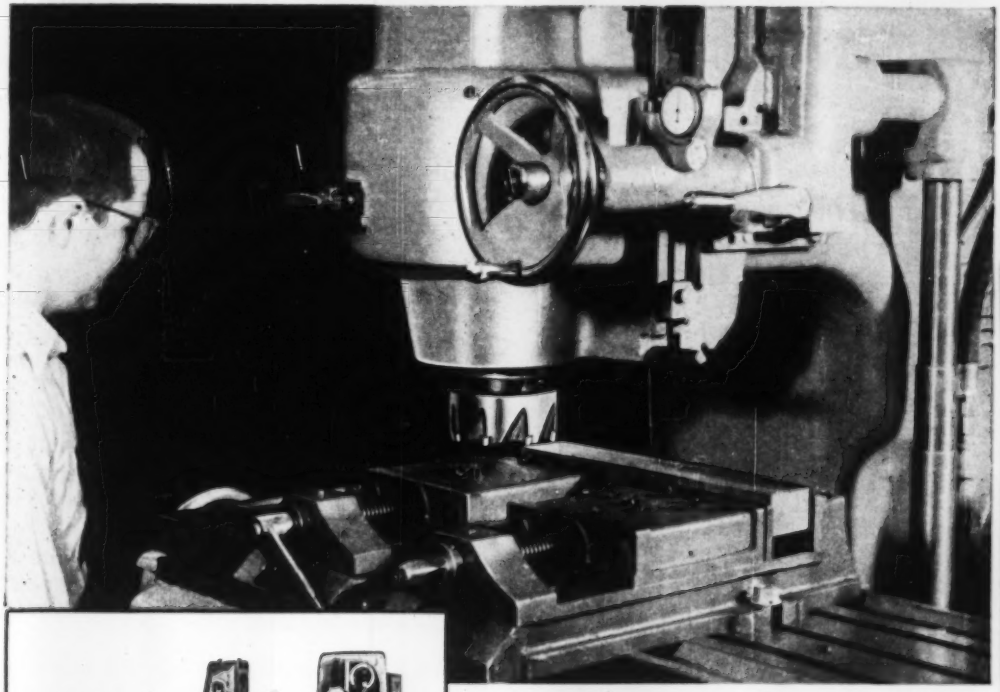
George F. Holtz, owner of **Stuart-Oliver-Holtz Co.**, metal finisher, Rochester, N. Y., died Apr. 13.

Earl D. Power, 56, chairman of the board and former president of **Lyon Metal Products Inc.**, Aurora, Ill., died Apr. 13.

Wallace B. Phillips, 66, president, **Pyrene Mfg. Co.**, Newark, N. J., died Apr. 15.

FACTS TELL THE STORY...

NEW KEARNEY & TRECKER CK MILLING MACHINE CUTS PRODUCTION TIME 75%



C-K MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

New CK column easily absorbed vibration from heavy cutting load.

Greater horsepower permitted maximum results from modern cutter.

24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds (⅛" to 90" ipm) meant operator selected proper combination to take full advantage of high horsepower and modern tools.

CK's 3-bearing spindle and flywheel assured fast metal removal, excellent finish.

CK's large (2" dia.) table feed screw gives greater bearing contact for smoother feed.

CK's positive, metered lubrication assures trouble-free operation.

The FACTS on this job are:

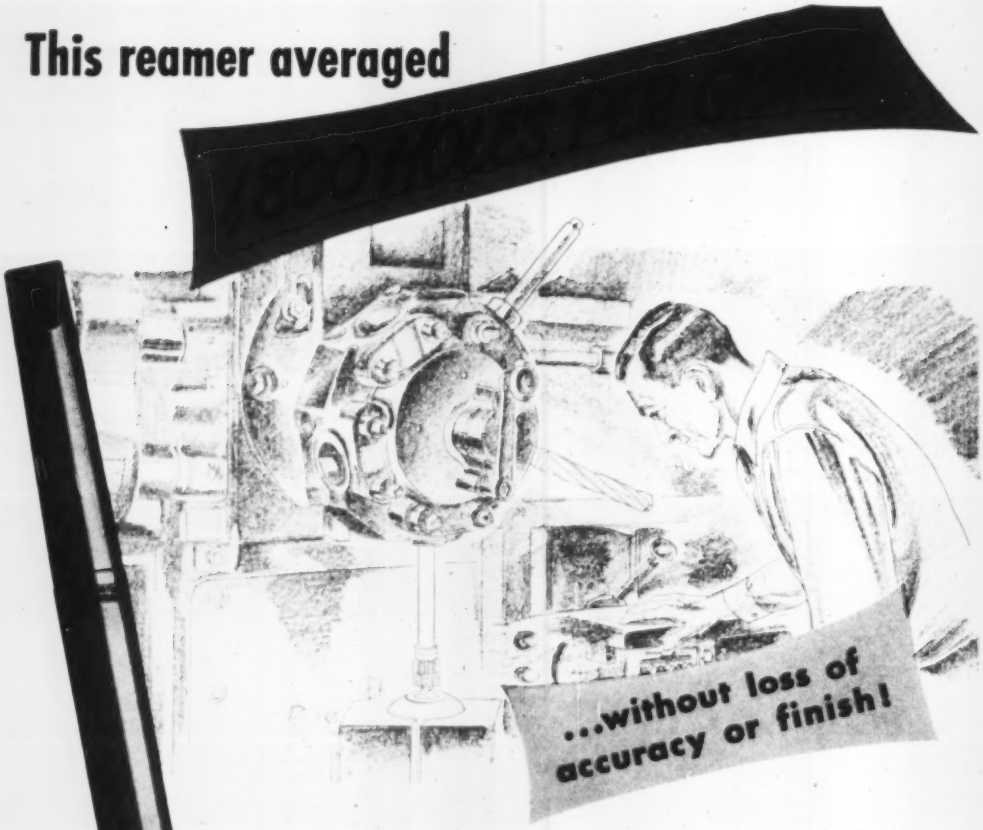
Operation: Face mill four sides
Workpiece: Ram for slotting attachment
Material: S.A.E. 4615 forging — 2¼" x 2¾" x 18½"
Machine: New 25hp No. 4 CK vertical
Cutter: 6" dia., 8 Tooth Carbide Face Mill with 7° negative primary rake angle.
Cutter Speed: 275 rpm **Depth of Cut:** ¼"
Table Feed: 25 ipm **Machining Time:** 3.8 minutes
Total Saving in actual machining time: 11.9 minutes or 75.8%

NOTE: Part machined is the operating ram used in a slotting attachment. It must be tough and accurate. It is milled to a semifinish state and finish ground to final accuracy.

It will pay you to see the new CK line of milling machines — check them against your own requirements. You'll notice how every feature is designed and job-proven to give you cost-cutting results — greater machine capacity, productivity and better finished products. So, for the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

This reamer averaged



The hole in the base of a projectile must be reamed to extremely close tolerances, both as to size and finish. Not every reamer can give you good results in these 1040 steel forgings without frequent regrinding. In tests on the set-up illustrated above, no other reamer equalled the performance of *Cleveland* High Speed Adjustable Reamers! These superior tools consistently averaged *1,800 holes per grind* without sacrificing accuracy or the requirement for a smooth finish of the hole. You too can get MORE HOLES PER GRIND with *Cleveland* Reamers. One of our Service Representatives will be glad to make arrangements for a test in your shop. Contact the nearest Stockroom, or . . .

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Production AND Engineering NEWS AT A GLANCE

ACID FROM COPPERAS—By the end of 1952 a British steel company will have a pilot plant in operation making 1 ton per day of 40 per cent sulphuric acid, using the Autox process. Its raw material will be the copperas (crystallized ferrous sulphate) residue from waste pickle liquor from which the free acid has already been recovered. In this process, the copperas is roasted to obtain sulphur dioxide. The sulphur dioxide is passed with air through water containing manganese sulphate, which acts as a catalyst between gas, air and water. These react to form acid of up to 40 to 50 per cent strength.

HF ALLOY STUDIED—HF alloy (21 per cent chromium, 9 per cent nickel) is getting some intensive study as part of the Alloy Casting Institute's nickel and chromium conservation program. Long overlooked as high temperature heat-resistant material, some 14 compositions within the HF alloy specification range are being re-examined. If present research continues favorable, users should be able to substitute this grade in many intermediate temperature applications for materials containing 30 to 100 per cent more nickel.

TRANSMISSIONS ARC-WELDED — Automatic operation of special arc welding machines is facilitating the joining of parts for transmission assemblies. Complete machine cycle on one part is only 15 seconds, with total time per piece, floor-to-floor, 20 to 25 seconds. The difference is in loading and unloading. Indexing is done by air and motions are cushioned by dashpots. The submerged arc process on these parts gives good results. p. 74

TURPENTINE LUBRICANTS—Synthetic lubricants from turpentine—that's the latest development from the chemical laboratories of the Department of Agriculture and the Navy. Oils for aircraft gas turbine engines, instrument oils and greases and hydraulic lubricating fluids have been produced. These can be used alone or mixed with other synthetic lubricants or mineral oils. The government chemists discovered that pinic acid can be combined with high-boiling alcohols to produce the special lubricants. Pinic acid is made by oxidizing alpha pinene which constitutes more than 50 per cent of turpentine.

JET ALLOY DILEMMA—Machine tool manufacturers and tool designers are faced with some rugged problems in getting equipment into shape to handle high temperature alloys for jet engine applications. Not only are the materials tough to machine, but the engine parts themselves sometimes present difficulties. They have larger diameters and thinner wall sections, close tolerances, and they must be turned out in quantity and still be interchangeable. How to do all this and still maintain long tool life, remove the metal fast, lower the power input and get satisfactory surface finish—that's the questions the tool builders are trying to answer. p. 76

JUST PLAIN BORAX—Rasorite, a sodium borate ore concentrate known as borax, supplements aluminum as a deoxidizer in the manufacture of rimmed steel. Rimmed steel is so called because on "freezing" in the ingot mold an outer rim is formed which contains less carbon, phosphorous and sulphur than the average composition of the ingot.

RESIZED TUBING—An elongated steel ball and a length of cable are being used to resize steel and aluminum tubing which is flattened during bending. Egg-shaped steel balls, with lengths of aircraft control cable attached at the small ends are drawn through the tubing by a hydraulic cable testing machine. From two to four balls are used, starting with small ones and graduating to one the size required for the final inside diameter of the tubing. The operation makes possible tolerances as close as 0.001-inch.

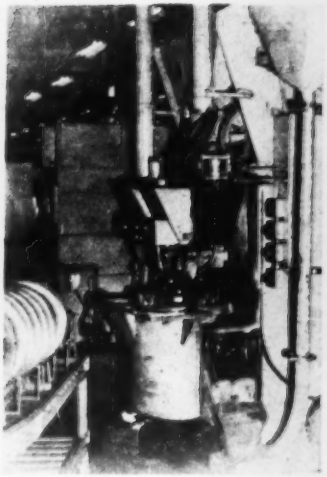
CURRENT ON, SCALE OFF—Induction heat is being used to remove surface scale from metal parts after heat treatment. Underlying principle of the induction heating method is to raise the temperature of the surface scale so fast that its expansion will cause it to flake off from the cooler base metal. Irregular electrical conditions in the scale and the progressive heating cause the scale to disintegrate as it separates from the base metal. The induction coil is electrically insulated and a high-temperature refractory paint applied to prevent short-circuiting by the scale.

CHROME STAINLESS AGAIN—From its traditional place as an automotive trim, architectural interior, specialized chemical or moderately heat-resistant grade, type 430 has widened its scope. It is used now in many new applications formerly served by chromium-nickel types exclusively. The straight chromium grade can be deep drawn and otherwise fabricated to an extent not previously believed practical. p. 80

IGNITES AT 600° F, WELDS AT 7000—Heliarc welding of magnesium casings at Hill Air Force Base keeps these expensive B-26 engine parts in use. Before the salvage method was adopted cracked casings were sold for scrap. Welding of magnesium, which ignites at about 600° F, is done by encasing the weld area in helium gas, excluding oxygen and permitting welding temperatures as high as 7000° F.

Metalworking Outlook—p. 37 *Market Outlook—p. 145*

Close-up of indexing fixture as it looks when open and ready for loading below two automatic Lincolnweld heads that feed bare wire from two coils



Special welder used to submerge arc weld ring gears to flywheel webs

Transmission Assemblies Arc-Welded

By HERBERT CHASE

In a specially-built dual setup hub-like pilot is joined to flywheel. Two other machines make ten arc welds to fasten the ring gear, using an indexing arrangement

FLYWHEELS for Fordomatic transmissions built in Ford's new Cincinnati plant involve two neat and unusually fast jobs of submerged arc welding. These are accomplished in specially built Expert welders equipped with either one or two automatic Lincolnweld heads that feed electrode wire from coils. Each of the three machines has its own 400-amp Lincoln generator and provision for feeding granulated welding flux in streams that submerge the arc or arcs.

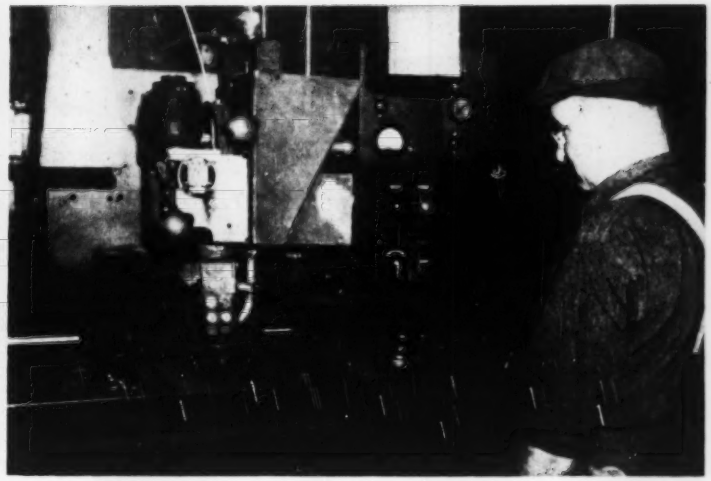
Operation of these machines is completely automatic save for loading and unloading the workpieces and for pressing the button that starts the automatic cycle. Excellent welds result and the percentage of rework needed because of porosity or other weld defects is exceptionally small.

Three-Part Construction — Flywheels consist of three parts: A circular and slightly dished disk or cover of $\frac{1}{4}$-inch mild steel plate, a central cup-like mild steel hub or pilot, drawn from 3/16-inch stock and closed on its domed outer end, and a starter ring gear shrunk around outside diameter. Cover and pilot are completely fabricated in the Cincinnati plant. The ring from which the gear is made is rolled from square section bar stock, its ends are resistance butt welded together and the ring is coined at the Ford Rouge plant. Machining, including tooth cutting, is done in the Cincinnati plant.

Flywheel web constitutes a cover that seals the forward end of the converter which is filled with oil. There can be no leaks at the arc weld joining the pilot to the web or at the gasket that fits between the cover and the mating die cast aluminum converter housing. This makes it essential to submerge under water and test each weldment while applying air pressure.

To make the circular weld that joins each pilot to the cover, the two parts are air clamped in one or the other of two fixtures mounted on the carriage of the machine shown in the illustrations. One fixture is unloaded and reloaded while the fixture holding the pair of parts previously loaded is rotated below the 5/32-inch L 60 Lincoln electrode. Wire is fed from the welding head. A spring-loaded fixture plunger that projects through the central hole in the disk centers the hub pilot relative to the disk as the two parts are air clamped.

Clamping Automatic—Clamping takes place automatically when the starting button is pressed or as soon threafter as the weld on the prior workpiece is completed and the head retracted. When thus clamped, the carriage shifts across the machine to welding position and at the same time carries the fixture containing the prior weldment to unloading position. When the shift is completed, the welding



Close-up of Expert machine for automatic submerged arc welding of hub-like pilot to the cover. Cover shown at the left station is nearing completion

Automatically

head feeds down, flux feed starts and the instant the arc is struck, the fixture starts to rotate and welding proceeds until the circular bead of weld metal deposited is completed.

This weld, about 7 inches long, is made in about 13 seconds, after which the head retracts, rotation of the workpiece stops and flow of weld flux is shut off. Then the carriage reverses and the welded piece, still in the fixture, is moved to unloading position and unlocked. While one weld proceeds, the next pair of parts is set in the second fixture. In this setup about 144 pieces per hour are completed.

Excess flux drops into a trough-like container below the fixture and onto an inclined screen that catches any large fused particles; these feed off the screen into a box. Good flux falls through the screen into a trough and is picked up by a small conveyor that elevates and dumps the flux back into the feed hopper.

Weldments Air-Tested—The operator unloads the machine and knocks off flux and slag adhering to the weld. Next to the bench is a two-place test fixture in which each pair of weldments made is air clamped against a gasket and then is submerged. Air pressure at 90 psi is automatically turned on and, if there are any leaks in the weld, air bubbles reveal their presence and the piece is rewelded.

Rewelding is done in the same machine that made the original weld, a second bead being laid over the first. This commonly stops the leak but, if not, the two beads are machined off and a completely new weld is made. Few repairs are required, however.

After weldments pass the pressure test they go to a machine on which the outer diameter of the cover is machined. They then proceed to a station where a ring gear, previously machined and heated, is pressed and shrunk onto the disk's machined outside diameter. Then the assembly is passed along a conveyor where it cools and reaches one of two duplicate and specially built Expert welders.

Arc Spot Welds—These machines make arc spot welds that join the ring gear to the cover at ten points. These submerged welds take shear in service, when starting torque is applied, and are made two at a time where the ring gear and cover or web join. Each machine has two Lincolnweld heads each of which automatically feeds welding wire and granulated flux, the latter submerging the arc. The assembly remains fixed during each weld but is automatically indexed five times between welds, so the specified total of ten welds per assembly is made.

These machines are completely automatic except for loading and unloading. After the operator places an assembly in the open fixture he merely presses a button and the machine automatically locks the workpiece, closes the fixture, makes two welds, shuts off the current; indexes, makes two more welds and repeats welds in pairs until all ten welds are made. Then the machine opens automatically so the weldment can be removed by hand and a new assembly can be put in place.

As the weldment is removed, flux resting on it is dumped into the hopper below the fixture. The operator brushes off any flux that has fallen onto the ten supports in the lower half of the fixture, so the next assembly will seat properly when clamped from above. All flux falling into the hopper reaches an inclined screen above a trough. This screen separates out large pieces and slag. Remaining granular flux falls through the screen into the trough and is elevated by a conveyor to refill the small hoppers on the two welding heads.

Total Time: 20 Seconds — Although the complete cycle of each machine is only 15 seconds, total time per piece, floor to floor, is 20 to 25 seconds, the difference being for the loading and unloading. Indexing is done by air, and motions are cushioned by dashpots. Each finished weldment is placed in a checking fixture to make sure no weld spots protrude enough to cause subsequent interferences. Then the weldments go to a Hearn & Dilts machine where the face of the gear away from the welds is machined. Outside diameter of the pilot or hub is turned; inside diameter of the gear, where it overhangs the web, is bored. Subsequently, the weldment is located on this bore while the pilot outside diameter is ground. Then, the machined part goes to a balancing machine.

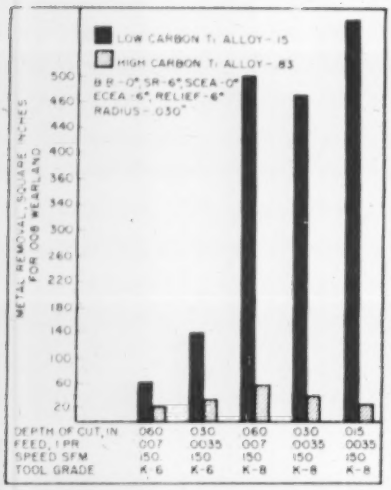
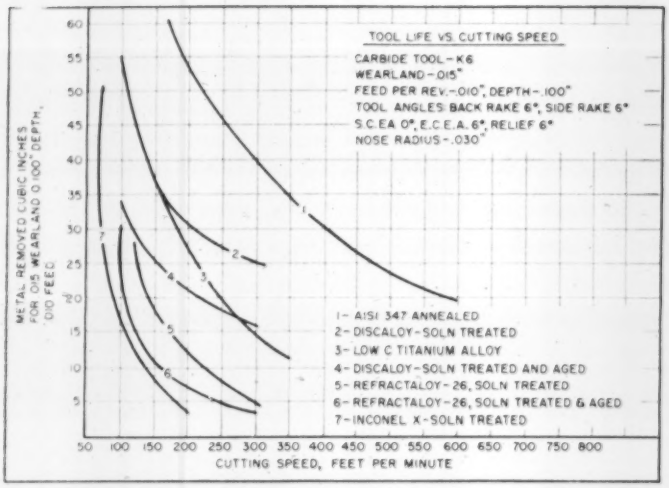

LOW CARBON Ti ALLOY - 15
HIGH CARBON Ti ALLOY - 83
B.R. - 0°, SR - 6°, SCEA - 0°
ECEA - 6°, RELIEF - 6°
RADIUS - .030"
METAL REMOVAL, SQUARE INCHES FOR .008 WEARLAND
DEPTH OF CUT, IN. .060 .030 .060 .030 .015
FEED, I.P.R. .007 .0035 .007 .0035 .0035
SPEED SFM 150 150 150 150 150
TOOL GRADE K-6 K-6 K-8 K-8 K-8

Chart shows how increased tool life is available by varying carbon level


TOOL LIFE VS. CUTTING SPEED
CARBIDE TOOL - K6
WEARLAND - .015"
FEED PER REV. - .010", DEPTH - .100"
TOOL ANGLES: BACK RAKE 6°, SIDE RAKE 6°
S.C.E.A. 0°, E.C.E.A. 6°, RELIEF 6°
NOSE RADIUS - .030"
1 - AISI 347 ANNEALED
2 - DISCALOY - SOLN TREATED
3 - LOW C TITANIUM ALLOY
4 - DISCALOY - SOLN TREATED AND AGED
5 - REFRACTALOY - 26, SOLN TREATED
6 - REFRACTALOY - 26, SOLN TREATED & AGED
7 - INCONEL X - SOLN TREATED
METAL REMOVED CUBIC INCHES FOR .015 WEARLAND & .100" DEPTH, .010 FEED
CUTTING SPEED, FEET PER MINUTE

Graph shows effect of cutting speed on tool life for five different alloys. Note volume of metal removed increased at lower speed range

Jet Alloys Toss Challenge to Machine Tools

Creation of tough alloy components for the jet engines puts spotlight on the need for rugged, more powerful machine tools to meet increasing production demands

By P. G. DeHUFF and D. C. GOLDBERG
Aviation Gas Turbine Division
Westinghouse Electric Corp.
Pittsburgh

NEW TOOLING methods and machines are required to produce the jet engine parts if they are to be built in the volume needed. Machine tools must be designed to meet the demands of these tougher alloys, components of larger diameter and thinner wall sections, close tolerances, interchangeability and higher production rates. This means increased horsepower, heavier beds, better bearings, variable speed drives and automation in handling and contouring.

In machining high temperature alloys, as with other steels, the optimum aim is long tool life, rapid removal of metal, low power input and satisfactory surface finish. It is readily seen that in roughing operations the chief goal is to remove metal as rapidly as is economically possible, while in finishing the attainment of the desired microinch finish and accurate contour is required.

Seven Factors—To achieve these goals, it is necessary to consider the following seven basic factors, variations in any one of which will have an immediate effect on the production rate and the quality of the completed part: Inherent machinability of the alloy, design of the part being fabricated, design and type of the cutting tool, capacity and rigidity of the machine tool, accessory tooling, feeds and speeds, coolants.

Alloys used in jet engines are generally considered to be in the difficult-to-machine class. This is not strange when you find such elements as cobalt, chromium, molybdenum and titanium as major constituents of the alloys. These same elements make up the high-speed cutting tools. An example of this is the use of Stellite for rotating turbine blades. This material has long been used for a cutting-tool tip. Such parts are rarely machined to shape but are cast close to finish size and ground.

Decision to make a part from a specific alloy depends upon meeting the stress requirements, corrosion resistance and whether the material will be available for production quantities. As one proceeds from the compressor end to the turbine end, the alloy content of the parts increases.

Alloy Up; Index Down—As the alloy content of iron base materials goes up, the machinability index goes down. This is understandable when you consider that when the metallurgist adds specific elements to increase hot strength, he also increases the resistance to cutting shear. For example, the shear strengths in cutting for high temperature alloys are high in the order of 135,000 psi, as compared to 109,000 psi for AISI 347.

Besides this factor of shear strength, other indices are useful in determining the inherent machinability of an alloy. The coefficient of friction is significant as well as being easy to control since

changes in coolants, feeds, speeds, tool design effect its magnitude immediately.

Plastic properties of the metal have an important effect on the machining constant. Variations in this index are controlled by varying thermal heat treatments. Recent work has shown that this factor has a direct correlation to the shear angle of the chip formation. The larger the shear angle, the thinner the chip and the better the machinability.

These three factors: Shear strength, coefficient of friction and machining constant, plus the hardness, strain hardenability and the amount of abrasive particles on the metal all affect the inherent machining qualities of the alloy.

Design Trend — Basically, the axial-flow gas turbines consist of a series of thin-walled circular elements bolted together and containing the rotating elements. The design trend is to larger diameters and still thinner sections so that increased thrust can be developed for a minimum engine weight.

These parts are made from material that is received in the cast or forged condition as sheet metal or bar stock. In the cast condition, the part is cast as close to shape as is practical and then given a solution anneal to establish its optimum machining condition. Centrifugal castings are used to an ever increasing extent.

Problem of Tolerances—Because the jet engine has to be in perfect static and dynamic balance, close tolerances that have to be maintained on all parts pose another problem. A finish-machined compressor disk has a cross-section of less than 0.100-inch in some places. If you have ever tried to remove a few thousandths of an inch from a material which is not fully stress-relieved you know it distorts. This will occur on a disk which is not stress-relieved. The English engineers have overcome this by finish-machining both sides of a disk simultaneously. American manufacturers should consider this since the present trend in disk design does not indicate thicker sections.

From data presented by the authors at the 16th Annual Machine Tool Electrification Forum, Buffalo, April 1 and 2.

Most parts are designed with liberal radii to prevent stress concentrations. Sometimes many different radii will be incorporated in the same part. This raises a machining problem which necessitates a considerable amount of hand feeding and blending.

Tools Are Carbide—Use of materials that contain very hard carbide particles in a tough matrix, such as the high temperature alloys, necessitates the use of tools that are abrasion and shock resistant, and have high hot hardness. Carbide tooling is common practice in the jet engine industry today. Standardization of single-point cutting tools has been established along with the most desirable tool design for most of the alloys being used.

The majority of these alloys exhibit a marked tendency to work hardening. Tools must be rigidly supported and must have keen cutting edges.

Many jobs have been overcome by changing rake angles on a tool. In general, the softer the material the greater must be the clearance angles. Not only does a tool have to be designed to do the job called for by the print, but it has to be designed for the material.

To prevent excessive tool wear and reduce the contact of the chip with the tool, intelligent use of a chip breaker is of extreme value in machining these alloys—particularly in turning, drilling and broaching.

Machine Capacity—It has been mentioned that these high temperature alloys are considerably tougher to machine than AISI or 347. On a machinability index the former is rated at 50 per cent whereas the latter is rated at 35 per cent. Inconel X on a similar scale would be about 5-10 per cent and Discaloy 20 per cent. This means considerably more power is required to machine a part from Inconel X than from one of the stainless steels.

Most of the engine lathes used in roughing operations are powered with a 20-hp motor. Roughing out disks on such a lathe taxes the equipment to a maximum. If the operations are performed on vertical turret lathes, which are equipped with 30-hp motors, conditions improve considerably. Heavier cuts can be taken at optimum speeds. It is felt that 50-hp motors will soon be needed on lathes and boring mills if they are to be able to rough out disks and housings in the quantities and at the speeds which are needed.

60-Inch Swing Needed—An additional consideration which is of vital importance is the factor of ever increasing diameter of the parts. In the near future a majority of the engine lathes will not be usable for compressor disk work. Lathes with a 60-inch swing will be required.

In finish turning, the need for heavy duty lathes is absent. Lathes with hardened bearings, and special variable speed motors with shaved and hardened gears must be used. Many manufacturers are now making T-bed lathes to fulfill this requirement. Volume will be needed to do the job that is being planned.

For best results, lathes which are designed for fast roughing should not be used for the precise finishing operations.

Optimum machining characteristics of these alloys are limited to a fairly narrow surface speed range. This problem becomes critical when one considers that in the turning of a disk with a diameter of 30 inches the surface speed can vary considerably. Today most machine tools do not have enough versatility in the low speed range of 15 to 50-rpm that is required to maintain a uniform surface-speed across the surface of a disk. The answer would be the use of variable speed drives incorporated into the machine tools.

Automatic Contour — Contour machining of disks is difficult when done by hand feeding. It need not be so if there is incorporated a means for having the operation controlled from a master tracing. Many automatic feeding heads are available today such as cams, templates, magnetic wire, punched tape and others. All have merits. It would be well for us in the jet engine industry if the machine tool industry would establish their most promising design and start producing in volume.

Now that we have made our machines more and more automatic,

we have a problem to consider which is overlooked too frequently how do we dispose of the chips automatically. These automatic machines lose much of their value when the chips are allowed to accumulate.

Faster and more rigid methods of clamping are needed to accompany the trend of automation in tooling. Clamping is the stepchild of the industry. It is not unusual to see a fully automatic tool with hand-clamping devices.

Call Is for High HP—Tool life varies greatly with cutting speed. Of particular significance is the steep climb in volume of metal removed at the lower range of speeds. The volume factor increases rapidly with increasing feed and depth of cut. Advantage cannot be taken of this unless the machine tool builder constructs a more rigid machine powered with higher horsepower motors.

These data also confirm the need for the variable speed motor. Continuous advantage can then be taken of the optimum machining characteristic of the alloy being used.

Surface finish is dependent upon feed and speed as in all finishing operations. It is accentuated in the high temperature alloys due to their work hardening characteristics. If these parts are finish-machined in the hardened condition, this factor diminishes in importance.

Coolants Needed: On the Spot—Every shop has its favorite coolant and it changes almost every month in its popularity. It is axiomatic that if the action of the coolant is to be of value it has to be available at the cutting edge at the instant of cutting. This type of thinking has led to the application of carbon dioxide and of the Gulf Hi-Jet process.

By the intelligent use of coolants, a machining job can be aided. However, too often the coolant is cooling the work or the tool but not the cutting zone and, therefore, no value is received. Consideration should be given to having the coolant feeding through the tool post or tool shank.

Challange in Titanium—No discussion of this type is complete without the mention of titanium and its alloys. There has been a considerable amount of literature on machining titanium. Some of it is sound, quite a bit has been hearsay. We have been investigating the application of titanium for compressor disks and other parts for the past several years.

In these studies data have been accumulated pertaining to the machining characteristics of this new material. With proper alloy selection, tool design, and use of recommended feeds and speeds, titanium is machinable but still with difficulty. Because titanium carbide is harder than the tungsten carbide found in most tools, excessive tool wear will result.

Matrix metal is characterized by being work-hardenable to a degree below that of the 18-8 stainless steels but is tough and has a high shear strength. In addition it has the tendency to smear or build up on a tool.

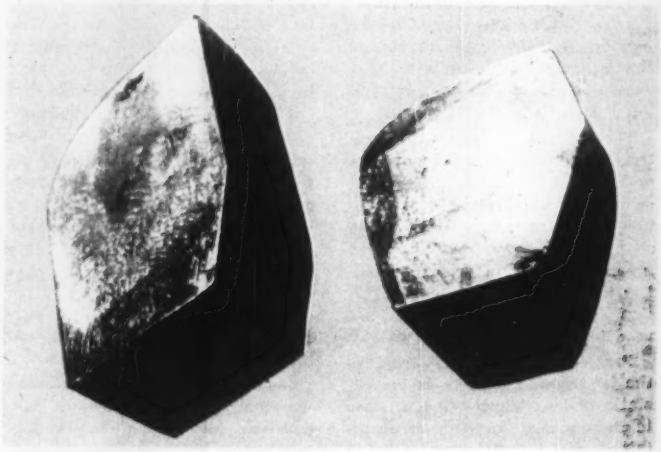
Because of these properties, the material falls into the difficult-to-machine class. Increased tool life can be obtained by varying the carbon level in the material and by using hard grades of carbide.

We feel that titanium can be machined as readily as the 12 per cent chromium stainless steels which have been used for compressor disks.

One-Pass Broach—In the beginning, two pass broaches were designed using 18-4-1 high speed steel. Some five or six slots were broached and size was lost. Some improvement was shown by going to 18-4-2 and 18-4-2 plus 5 per cent cobalt. By proper design and the present use of carbide-tipped broaches, titanium can now be handled in production schedules. However, the use of two-pass broach still has a major disadvantage due chiefly to the lack of rigidity in the broaching fixtures and insufficient power in the broach. This lack of rigidity results in misalignment and movement of the disk. Use of a single pass overcomes this objection to some extent. To go to the single pass broach, machines of greater length and power are required.

Broach capacity is limited today in light of present production requirements. Present broaches of the 72 and 90-inch capacity will not be adequate; the 120-inch will be required. Broaches must have greater rigidity of the bar, fixtures and jigs. Increased attention will have to be paid to the affect of cutting design on forces placed on the machine tool.

Coupled with sound machining practice which is required with machine tools which have the necessary power and versatility, attention must be directed to the unusual or new approach to machining.



Tip on right removed 470 sq in. of low carbon titanium alloy. One on the left removed only 25 sq in. of high carbon alloy with same speed and feed

CHROME STAINLESS: *Easing the Pinch*

Certain high and low chromium steels possess good mechanical properties, high fabricability and are excellent replacements in stainless applications formerly requiring nickel

By RICHARD E. PARET
Stainless Steel Specialist
American Iron & Steel Institute
New York

INTEREST in stainless alloys that contain no nickel centers on type 430. This general-purpose grade, with about 17 per cent chromium, is the standard type that comes nearest to serving as a replacement in some former 18-8 stainless applications. Other chromium types, with more and with less chromium are also worth investigation for many applications. Like the 17 chromes, they were well established in their own right before the current emergency put restrictions on the use of nickel.

12 Chrome — At the low end, types 410, 416 and others with 12 per cent chromium offer resistance to mildly corrosive situations. They also combine a remarkable set of mechanical properties. The 12 per cent chromium alloys can be hardened by heat treatment. Great strength and hardness (195,000 psi tensile and 300 brinell) can be achieved by heating, quenching and tempering. Excellent properties are retained up to elevated temperatures. Small differences in alloying, within the type specification range, influence hardenability a great deal. Carbon-to-chromium balance and presence of other elements both will affect heat-treated properties. Type 410 can be forged, cold formed, machined and sheared. It can be welded if effects of its high hardenability are minimized by suitable precautions. A modified grade, type 405, is readily weldable as it is not appreciably hardenable.

The 12 per cent chromium stainless that has been used many years for turbine buckets is a selected-quality version of type 410, designated type 403. Reasons for its application are: Metal can be forged; it can be machined while soft, then heat treated for strength and hardness; finished pieces have great strength, reliability and resistance to wear and erosion. Other established applications for type 410 and related variants include valve parts, shafts, gears, pawls, etc. Fabricated piping, tanks, screens, and similar processing equipment of type 410 are widely used where corrosive attack is not severe.

17 Chrome—In its general purpose role, type 430 has been called upon to meet many requirements. It serves well under widely varying circumstances. Nevertheless, the shortcomings of this alloy in contrast to the 18-8 stainless types should be recognized.

First, where extremely low temperatures are to be encountered, no chromium stainless can compete in impact resistance with the 18-8s. In creep strength at high temperatures, type 430 is also inferior. However, its oxidation resistance and low coefficient of expansion give it advantages for applications like furnace parts.

Weld With Caution — Second, welding type 430 should be ap-

AISI STAINLESS TYPE EFFECT OF TEMPERATURE ON PROPERTIES	410	416	430	430 F	440
Creep strength, annealed, psi (1% set in 10,000 hr)					
1000 F	9,200		8,500		6,000
1100 F	4,200		4,300		3,000
1200 F	2,000		2,200		1,500
1300 F	1,000		1,300		700
1500 F					300
Maximum service temperature (in air), F					
Continuous	1250	1250	1500	1500	2000
Intermittent	1500	1500	1600	1600	2050
Low-temperature (—80 F) properties, annealed					
Tensile strength, psi	128,000		81,000		
Yield strength, psi	94,000		44,000		
Elongation in 2 inches, %	22		36		
Izod impact, ft-lb	25		5		

AISI STAINLESS TYPE	410	410	430	430 F	440
Nominal designation	Basic 12% Cr Hardenable	Free Machining 12% Cr Hardenable	Basic 17% Cr Not heat-treatable	Free Machining 17% Cr Not heat-treatable	24% Cr Not heat-treatable
CHEMICAL COMPOSITION (per cent)					
Carbon	0.15 max	0.15 max	0.12 max	0.12 max	0.35 max
Manganese	1.00 max	1.25 max	1.00 max	1.25 max	1.00 max
Silicon	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max
Phosphorus	0.04 max	*	0.04 max	*	0.04 max
Sulphur	0.03 max	*	0.03 max	*	0.03 max
Selenium	.....	*	.....	*	.....
Mo or Zr	.....	.....	.....	0.06 max	.....
Chromium	11.50/13.50	12.00/14.00	14.00/18.00	14.00/18.00	23.00/27.00
Nitrogen	.....	.....	.....	.....	0.25 max

* (P, S, or Se, 0.07 min)

proached with some caution. Brittleness at welds can be overcome by annealing, but grain size is not reduced. Use of chromium-nickel rods will offer increased ductility of the weld bead itself if annealing is impractical. Difficulty has been experienced with intergranular corrosion at welds of type 430. This possibility suggests caution, though it need not rule out welded designs.

In most other respects, type 430 offers no difficult problems. Fabrication by various standard processes may be different in detail from 18-8 practice. Corrosion resistance of type 430 is less than that of type 302. How much less cannot be expressed in generalized terms, but many former 18-8 stainless steel applications allow enough margin so that a 17-chrome stainless will also do a very good job.

From its traditional place as an automotive trim, architectural interior specialized chemical, or moderately heat-resistant grade, type 430 has widened its scope. It now finds application in many new fields, formerly served almost exclusively by the chromium-nickel types. Restrictions on nickel have introduced type 430 to uses in exterior architectural panels, some parts of food handling equipment, household pots and pans, and certain kinds of industrial processing equipment. It has been found that type 430 stainless can be deep drawn and otherwise fabricated to an extent not previously believed practical.

27 Chrome—Type 446 is known as a high-temperature, scale-resistant alloy. It is not exceedingly strong at elevated temperatures, but is ductile and quite resistant to oxidation and corrosion while at these high temperatures.

After long heating at, or slow cooling through 1250-750° F, and subsequent cooling to room temperatures, type 446 tends to be brittle at welds and in heavy sections of any sort. This disadvantage at room temperature cannot be overcome by heat treatment. However, the ductility returns when the steel is reheated. Thus, toughness at elevated temperatures, where the alloy normally finds application, is not impaired.

There may be applications that call for more corrosion resistance than what type 430 can offer, but which do not justify the use of a nickel-bearing stainless. With suitable precautions, type 446 may often be applied successfully in such cases. Brittleness of welds can be circumvented by techniques that speed cooling through the critical range or by designing for riveted joints. Type 446 can often be substituted in some high-temperature uses that have formerly called for type 310, if its lower elevated temperature strength is taken into consideration.

Special purpose chromium stainless steels, like the hardenable cutlery grades, may solve unusual application problems occasionally. Also, many producers are furnishing modifications of the standard chromium stainless steels. Some of these modified grades, by virtue of titanium additions or special control on analysis, offer improved behavior in welding, forming, corrosion resistance, etc.

AISI STAINLESS TYPE	410	416	430	430 F	446
REPRESENTATIVE MECHANICAL PROPERTIES					
Sheets and strip, annealed					
Tensile strength, psi	65,000		75,000		80,000
Yield strength, psi	35,000		45,000		50,000
Elongation in 2 inches, %	25		25		20
Rockwell hardness	B-80		B-80		B-83
Bars, annealed					
Tensile strength, psi	75,000	75,000	75,000	80,000	80,000
Yield strength, psi	40,000	40,000	45,000	55,000	50,000
Elongation in 2 inches, %	35	35	30	25	25
Rockwell hardness	B-82	B-82			B-86
Endurance limit, psi	40,000	40,000	40,000	45,000	47,000
Bars (1"), cold drawn					
Tensile strength, psi	100,000	100,000	85,000	90,000	85,000
Yield strength, psi	85,000	85,000	75,000	80,000	70,000
Elongation in 2 inches, %	17	13	20	15	20
Rockwell hardness	B-94	B-94			B-90
Endurance limit, psi	53,000	53,000	46,000	48,000	

AISI STAINLESS TYPE	410	416	430	430 F	446
TEMPERATURES, F					
Initial forging	2000/2200	2100/2300	1900/2050	1950/2100	1950/2050
Finish forging*	1600/1700	1600	1300/1400	1300/1400	1600
Full annealing (cool slowly from)	1500/1650	1500/1650			
Low annealing (cool slowly from)	1200/1400	1200/1400	1400/1500	1250/1400	1450/1600
Hardening (cool rapidly from)	1700/1850	1700/1850	(none)	(none)	(none)
Tempering	400/1400	400/1400			

* (often worked at lower temperatures after forging for grain refinement)

AISI TYPE NUMBER	410	416	430	430 F	446
PHYSICAL PROPERTIES (annealed)					
Modulus of elasticity in tension, psi	$29x10^6$	$29x10^6$	$29x10^6$	$29x10^6$	$29x10^6$
Density, pounds per cubic inch	0.28	0.28	0.28	0.28	0.27
Specific electrical resistance at room temperature, microhms per cm per square cm	57	57	60	60	67
Specific heat, Btu per pound per degree F (32 to 212° F)	0.11	0.11	0.11	0.11	0.12
Thermal conductivity, Btu per hour per sq ft per ft per degree F					
at 212° F	14.4	14.4	15.1	15.1	12.1
at 932° F	16.6	16.6	15.2	15.2	14.1
Mean coefficient of thermal expansion per degree F					
32 to 212° F	$5.5x10^{-6}$	$5.5x10^{-6}$	$5.8x10^{-6}$	$5.8x10^{-6}$	$5.8x10^{-6}$
32 to 600° F	$5.6x10^{-6}$	$5.6x10^{-6}$	$6.1x10^{-6}$	$6.1x10^{-6}$	$6.0x10^{-6}$
32 to 1000° F	$6.4x10^{-6}$	$6.4x10^{-6}$	$6.3x10^{-6}$	$6.3x10^{-6}$	$6.2x10^{-6}$
32 to 1200° F	$6.5x10^{-6}$	$6.5x10^{-6}$	$6.6x10^{-6}$	$6.6x10^{-6}$	$6.4x10^{-6}$
Melting point range, degrees F	2700/2790	2700/2790	2600/2750	2600/2750	2600/2750

Die Steel Data Released

Test results on Alhead, product developed to improve die steel for cold heading dies, have been released by Tool Steel Division, Allegheny Ludlum Steel Corp. Product is designed to provide a high alloy steel that can be water-hardened exactly the same as straight carbon or carbon vanadium steels used formerly for cold heading dies. Wear resistance attributed to the product indicates die life that should provide excellent parts production in service. The laboratory "blue sheet" on this grade gives certified data on analysis, proper methods of handling and shop treatment, complete physical properties, etc. To get copies, write the manufacturer, Oliver Bldg., Pittsburgh 22.

NEW LINCOLN PLANT CREATED BY INCENTIVE INSPIRED CO ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

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WELDED STEEL SIMPLIFIES CONSTRUCTION IMPROVES PERFORMANCE, CUTS COST 33%

By **Russell M. Roberts,** Chief Engineer,
Parks Woodworking Machine Company, Cincinnati, Ohio

Changing over our band saw frame to welded steel design has simplified many production problems while cutting costs by one third.

The original cast construction (Fig. 1) called for machining a complicated casting on which foundry rejections were common. The present welded steel design utilizes simple square tubing, sawed to size, clamped in a plain fixture and butt welded. The efficient use of steel has cut weight by 37% while increasing strength and rigidity.

An added benefit, made possible with welded design, now permits independent leveling of the work table that formerly could be accomplished only through a major adjustment of the frame itself.

HOW TO DESIGN IN WELDED STEEL
Complete training course for designers and production engineers now available for presentation in your plant. Send for complete details.

Fig. 3—Simple Jig *for welding square steel tubing components consists of clamps and locating pads.*

Fig. 4—All Welded Steel Frame *for the Parks Woodworking Machine Co., Cincinnati, Ohio. Sides are brake formed from 12 gauge metal.*

PROPER DESIGN IN WELDED STEEL ALWAYS IMPROVES PRODUCT, LOWERS COST

Fig. 1—Original Construction— *Machine bracket formerly weighed 56 pounds, was difficult to cast, high cost incurred from excessive rejects.*

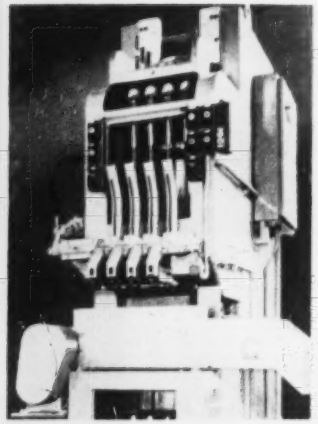
Fig. 2—Welded Steel Design *is stronger, more rigid yet weighs only 35 pounds. Weldment costs 35% less than original casting. Eliminates considerable time in machining and assembly.*

HERE'S MORE PROOF

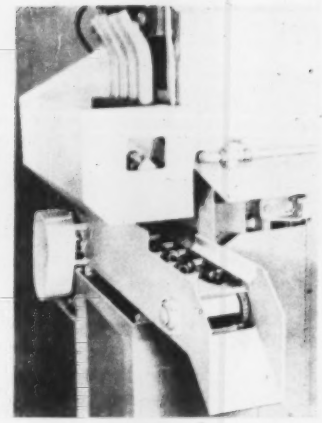
Machine Design Sheets available on request. Designers and Engineers write on your letterhead to Dept. 65.

THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT



View of semiautomatic loading device with guard on shuttle setup removed



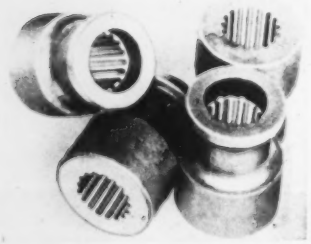
Finished parts being unloaded from broaching machine on a conveyor

AUTOMATIC BROACHING: High Output from Single Machine

Semiautomatic magazine loader and automatic conveyor unloader combined with multiple broaching produce 13,600 splines per hour in steel forgings

APPLYING principles of automation even to a high output unit like a broaching machine yields 13,600 splines per hour in steel forgings. The machine is a 20-ton, 48-inch stroke pull-up type made by Colonial Broach Co., Detroit. Features permitting the attainment of the high production rate are multiple broaching and unique load and unload devices.

Four parts are broached at one time. A semiautomatic magazine loader and an automatic conveyor unloader provide an output rate of 800 precision broached parts per hour.



Four parts with finished splines as produced by a single stroke of broach

In operation the machined forgings are dropped into the magazine by the operator. Slots in the magazines permit operator to observe loading conditions at all times. Another magazine feature is one that assures parts are always put in right side up by the operator. Parts at the bottom of magazines drop into forked holders in a shuttle device and are shuttled into position above the broaches.

While the broaches are pulled up through the parts, the shuttle device returns to loading position to pick another set of four parts. This releases the parts being broached so they are free to drop off the broaches at the end of the cutting stroke.

A swinging baffle deflects the broached parts onto the ejector conveyor which carries them away from the machine. As the broaches return to starting position, four more parts are shuttled into place for broaching.

Machine operation is hydraulic throughout with electrical controls and interlocks. The 17 splines produced in each part have an outside diameter of 1 3/32 inches.

Snubbers Cut Pipe Pulsation

Elimination of pulsations and accompanying noise in gas engine-driven compressor piping with gas and air line snubbers is reported by Burgess-Manning Co. in a survey and analysis of the problem. Vibration and noise, which resulted in line breakage requiring constant maintenance, was due to gas line surge from four compressors.

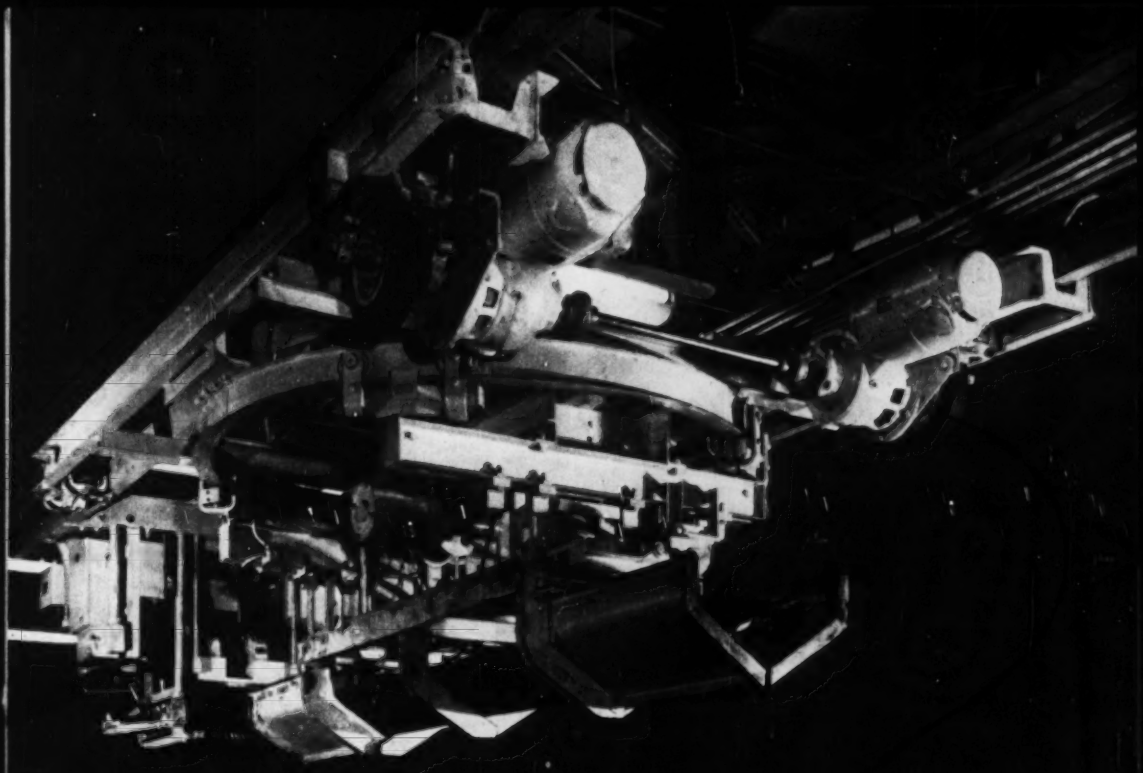
Using electronic equipment, including pressure pickup amplifier and oscilloscope, Burgess-Manning engineers determined the value of surge, then installed snubbers in the two pipe systems that were causing the most trouble. After installation, oscilloscope readings showed that in one line maximum peak pressure was reduced from 10 per cent of line pressure to less than 1 per cent in pressures of 300 pounds and from 11.3 to 2.4 per cent at pressures of 1600 pounds.

Company engineers say that in analysis, the pressure transducer generates a voltage for a given pressure change and faithfully reproduces in voltage the pressure changes in the pipe. This voltage is conducted to a three-stage amplifier, then to the oscilloscope screen where photographic records of the surge are taken. Surge amplitude is measured on a screen and calibrated voltage is developed to effect an equal amplitude deflection. Maximum peak pressure change then is calculated from the known data.

Plater Expands Manufacturing

Manufacturing Division, Cro-Plate Inc., Hartford, Conn., has expanded to include the entire 10,000 sq ft area at the firm's Windsor St. plant.

Plating Division, which formerly shared this space, has been reduced and transferred to the E. Hartford plant. Also at E. Hartford, the company maintains a complete research laboratory to perform analysis on all types of electroplating, with particular emphasis on application of chrome directly on base metal.



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Blast Furnace Practice

Raw Materials Problem IX(c)

Early application of Mesabi ores increased the volume of fines in the blast furnace burden but culminated in a greater heat recovery, a more rapid preparation of raw materials, a higher output of iron and a lower fuel rate

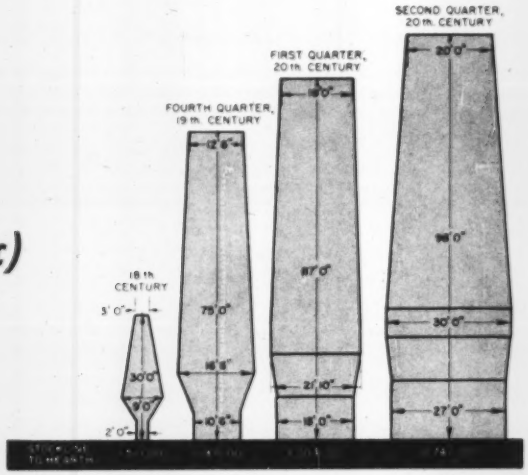

Fig. 18—Progress made in the blast furnace lines over the past 200 years

INCREASED preparation of stock in the shaft operation led to the practice of faster blowing which caused faster stock travel through the furnace. Faster blowing delivered more heat to the shaft but there was a complementary increased need for heat in this area to do the increased work caused by faster stock travel, and also, the increased sacrifice of heat to the top gas. Fast blowing gave rise to the expression: "Productive capacity of a blast furnace is dependent upon the speed with which coke can be burned." This statement is a half truth because in any furnace coke can be burned faster than stock can *recover* heat and the furnace will go cold; consequently, the ability of the stock to recover heat and retain enough of it to maintain the critical hearth temperature while performing other functions of the operation, is the governing factor and not the ability to generate heat.

Ore Fines Increase—Use of Mesabi Range ores introduced even greater percentages of ore fines into the burden than had been introduced with Old Range ores, and with the increase many operating difficulties were encountered which caused a tremendous development in the engineering features of furnace lines, stock distribution, dust collection systems, gas cleaning equipment, blowing equipment, etc. But also with the increased fines there was greater recovery of heat, and more rapid preparation of stock for smelting, with benefit to productive capacity and the fuel rate. This irrefutable fact emphasizes the fallacy of the belief sometimes expressed, namely, that elimination of all fines from the furnace burden would be beneficial and would permit faster blowing. Emphasis is placed on the following comment because it is believed to be a basic principle of blast furnace operation:

The permissible blowing rate is determined by the character of the raw materials used, exemplified by the effect of the raw material's physical and chemical properties on the thermal requirements for preparing and smelting them, and the effect of the respective thermal requirements on maintaining the necessary balance between the shaft work and the bosh and hearth work.

With low-cost fuel, commercial considerations may at times justify the sacrifice of some heat, but a limit to the sacrifice always is determined by the degree of heat concentration in the shaft which will cause fusion there, and by the volume and the velocity of gas passing through the stock column which causes excessive dust loss.

When the Bureau of Mines research proved the location and dimensions of the coke combustion zone (Fig. 6, Part IV), and exposed the fallacy of the supposed need for blast penetration to the center of the furnace, the fear of widening the hearth to too great a diameter was removed. During the past two decades the trend in furnace construction has been toward larger hearth furnaces. For a period in this development it was possible to maintain parity between the diameter of the hearth and of the stockline at the top of the shaft as furnace shells were increased in overall dimensions. The result was, that as the volume of air blown into the furnace was increased in proportion to the increase in hearth diameter, the velocity of gas through the top diameter was not increased from what it had been with the smaller furnaces. Instead, with the construction of furnaces designed to produce 1000 or more net tons of iron per day, it became difficult to maintain the parity between the

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

Here's More Proof of B&W Allmul Firebrick Performance

BILLET HEATING FURNACE

"ALLMUL more than doubles life of lining"

A large manufacturer was faced with high refractory maintenance in the discharge zone of a side-discharge billet heating furnace. Combustion chamber temperatures were 2600F-2700F. Production was high—a billet was discharged every 30 seconds. Thermal shock and high temperatures caused various semi-mullite refractories to fail in 5 to 6 months. Then this area was relined with B&W Allmul Firebrick. Result: Allmul stood up for 13 months—2 to 2½ times as long!

ELECTRIC FURNACE ROOF

"ALLMUL lasts 3 to 6 times as long"

In a six-ton electric furnace, handling 15 tons of stainless steel per charge, super duty firebrick had to be replaced every 20-40 heats. Pouring temperature of the metal was in excess of 3100F, with higher temperatures attained in the furnace during periods of oxygen introduction. The owner installed B&W Allmul Firebrick, hoping for a life of 80 heats. Allmul in the first roof lasted for 122 heats—42 more than hoped for. The second roof of Allmul went to 131 heats! Result? Additional orders for B&W Allmul.

INDIRECT ARC FURNACE

"All furnaces converted to ALLMUL after comparative tests"

A large company making alloy steel castings has several indirect arc furnaces melting various alloys, with pouring temperatures varying from 2700F to 3100F. With highest temperature alloys, semi-mullite brick burned out in 6-10 heats. B&W Allmul, which cost approximately the same, showed no appreciable wear after 20 heats. On alloy steels in general, this customer reports far less slag formation (an indication of reduced refractory wear) with Allmul than with any other refractory used. Result: All furnaces are being relined with B&W Allmul Firebrick.

FORGE FURNACE HEARTH

"ALLMUL lengthens life, keeps dry hearth"

A drop forge company was faced with this problem on its 72" wide slot-type furnace operating at 2350F-2400F: Low cost refractories gave soupy slag on the hearth, affecting product quality and die life. More expensive refractories, including chrome plastic and chrome firebrick, eliminated liquid slag, but their life was so short that their use could not be justified economically. A completely new hearth was installed consisting of 4½" of Allmul on top of 2½" of B&W Junior and 5" of B&W IFB. Result: Completely dry bottom; easy removal of scale; *and Almull was in good condition after 5 months of operation.* Based on this performance, additional Allmul hearths were ordered.

Yes, the facts about B&W Allmul Firebrick speak for themselves. This fused mullite brick is proving its economy in dozens of severe service applications. The reason? A unique combination of refractory properties—high hot load strength, high resistance to spalling, good volume stability, a high melting point of 3335F—all resulting in lower furnace costs. Want more data? Write for Bulletin R-29.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick
B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment...
Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

Machine tool idea pool

In designing machine tools, as in planning countless other products, OSTUCO Steel Tubing provides an endless pool of practical ideas because of its *unlimited adaptability*. Collets, chucks, spacers, spindles, bearings, shafts, ferrules, and handles are but a few of the applications.

By varying the radius of a bend, the length of a taper, the dimension of an upset, etc., an old design can be improved or a new one created. By combining such operations, a part can be made to serve several functions, thus simplifying design. Parts may even be fabricated or forged beyond recognition as a tube section.

Whether you design machine tools or products of a distinctly different nature, you will want to investigate the many quality-improving, cost-reducing features of OSTUCO Tubing. We cannot always promise early delivery estimates on new civilian orders, because of military demands, but it will pay you to consult our experienced engineers about OSTUCO Tubing when redesigning your products to meet future competition.

Write for informative free booklet, "Fabricating and Forging Steel Tubing," showing the many basic fabricating and forging operations OSTUCO can perform.

THE OHIO SEAMLESS TUBE COMPANY

Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing

Plant and General Offices: SHELBY, OHIO

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hearth and top diameters because of the excessive weight and size of the larger bell and hopper required, the mechanism to operate the bells, and the increased difficulty in getting the proper distribution of stock within the furnace. Because of these difficulties the top diameters of the large furnaces are smaller than their hearth diameters. Fig. 18 illustrates graphically the change in furnace lines which is believed to have been of great importance in the development of American blast furnace practice methods, since it indicates the approach to and the passing of a critical relation between the stock preparation capacity of the furnace shaft and the smelting capacity of the bosh and hearth.

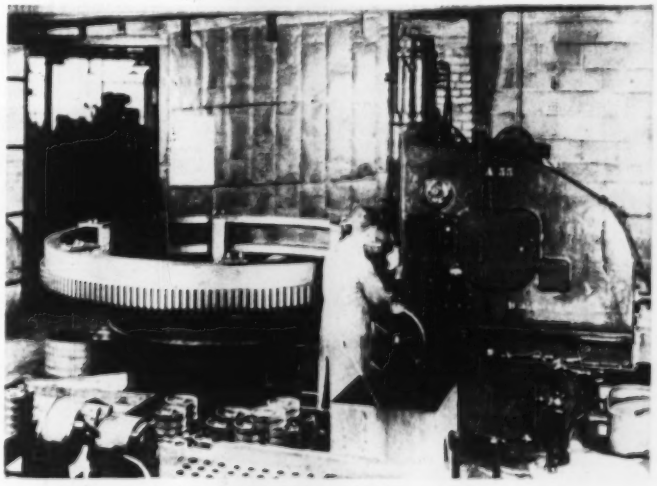
Velocity Is Increased—It is obvious that when the volume of air blown is in proportion to a hearth diameter greater than its associated top diameter, the greater volume of gas generated must pass through the smaller top diameter with increased velocity. The opportunity for the transmission of heat from gas to stock, and the *preparation capacity* of the shaft, therefore, will be lowered in proportion to the increase in gas velocity. The larger volume of air blown consumes coke rapidly, and the flow of stock through the restricted top diameters is faster than the like flow through furnaces which do not have restricted top diameters. More rapid absorption of heat is required to prepare fast flowing stock but the fast counter flowing gas column decreases the opportunity for heat transmission from gas to stock, and carries more heat from the furnace than a slower flowing column.

This brief analysis is presented as a reasonable explanation of the fact that large furnaces have not been as economical in fuel consumption as originally expected. The condition described is also a practical demonstration of a deliberate sacrifice of fuel economy to gain increased iron production. With willingness to sacrifice heat the effect of gas velocity on flue dust production in the upper shaft becomes the dominant factor of shaft operation and tends to obscure the factor of heat concentration lower in the shaft.

The described development in furnace construction is another practical demonstration of Johnson's 2-thermal equation theory, the distinctive nature of the difference between the shaft work and the bosh and hearth work, and the manner in which the productive capacity of one division limits the productive capacity of the other. So long as there was parity between the hearth and top diameters, the preparation capacity of the shaft and the smelting capacity of the bosh and hearth remained in the same relation to each other as they had been with smaller furnaces. When the hearth was enlarged to a greater extent than the top, however, the parity was lost, the smelting capacity of the bosh and hearth became greater than the shaft preparation capacity, and the shaft operation became pre-eminent in determining the productive capacity and the fuel rate of the combined operations.

Has Maximum Been Reached?—Failure of large furnaces to show a reduction in the fuel rate, which had been expected of them, is an indication that probably the maximum benefit has been attained in furnace construction lines, and that means must be found to increase the stock preparation capacity of the shaft operation to maintain a parity with the smelting capacity of the bosh and hearth operation.

Comparison of thermal balance data indicates that this means must be through the beneficiation of raw materials used, since they clearly indicate the difference in thermal requirements for the three classes of iron-bearing materials, namely, naturally lean, naturally rich and fully beneficiated ores, low-ash and high-ash coke, and zones in the furnace where the respective thermal requirements must be met. The data also indicate differences in furnace practice methods which must be employed to successfully use the several kinds of materials. As indicated, the difference in practice methods is largely in the blowing rates, and the effect of that difference on the efficient distribution and use of heat. Every furnace operation must have available the volume of heat required to effect its necessary thermochemical reactions, and, although the volume of heat required for the respective reactions is the same in all operations *per pound* of reaction constituents, the relation between the *number of pounds* of the constituents requiring low temperature



Big Gears Spur Aircraft Stamping

This 120-inch diameter spur gear is finished by Brad Foote Gear Works Inc. on one of the nation's largest Fellows gear shapers. Shaper was built first for gears up to 100 inches diameter, later expanded to 152-inch capacity. Many of these heavy-duty gears go to big presses for aircraft components stamping jobs

shaft work, and the number requiring high temperature bosh and hearth work, varies greatly between materials.

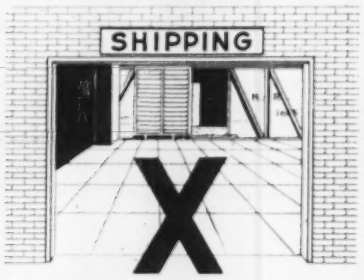
For the past 75 years engineering thought in American blast furnace industry has been dominated by operating conditions which have prevailed in furnace operations using natural Lake ores. This thought has been logical because the growth of the industry has been greater in iron producing districts using Lake ores than it has been in any other. Because of operating conditions created by Lake ore characteristics the trend in development has been an ever increase in the size of furnaces, and the blowing of more air blast. In the study of blast furnace operating principles it must be recognized that development has been one of providing better mechanical equipment to better serve an operating *practice method* which is favorable to ores having the characteristics of natural Lake ores, but there has not been any new development in *operating principles*. Although unquestionably the program of development has been correct so long as economic advantage could be obtained from smelting naturally rich Lake ores, it must be recognized that the natural change in the character of Lake ore (leaner ores) which interfere with the commercial economy of their use, or the artificial change in character caused by the beneficiation of lean ores, will inevitably require a change in furnace *practice methods* which can be successfully employed to serve the unalterable *operating principles*.

In this review of the development of American blast furnace industry over the past 200 years the purpose has been to indicate how operating practice methods have changed as the character of raw materials have changed. The changes in method were necessary in order to efficiently serve operating principles *which never change*.

Predicated upon the premise that practice methods serve operating principles it is reasonable to say when the beneficiation of raw materials is necessary that the product of beneficiation should be designed to serve operating principles rather than to maintain a practice method.

Effects Are Demonstrated —A few blast furnace operations in the Eastern district of the United States, where sintered iron ore concentrates and other volatile-free materials constitute the major part of the furnace burden, are the only operations in the world where there has been a full scale demonstration of the effects of fully beneficiated materials on the operating economy of the furnace, and opinion is offered that none of these have yet been developed to the fullest extent possible. In these operations the shaft work is greatly reduced compared to furnaces of equal dimensions using natural volatile-bearing materials, and smelting capacity of the bosh and hearth determines the productive capacity of the combined operations—with the cause of limitation being the *facilities for delivering heat to the bosh and hearth*. Hence, the important lesson to be learned from the experience of the Eastern district furnace operations, and with benefit to both

DOES "X" MARK THE BOTTLENECK IN YOUR PLANT?



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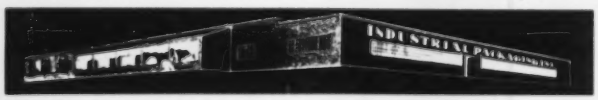

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Here's all the information you need on Spark Testing to quickly identify standard tool and die steels. This new, 20-page Carpenter Guide to Spark Testing will help you . . .

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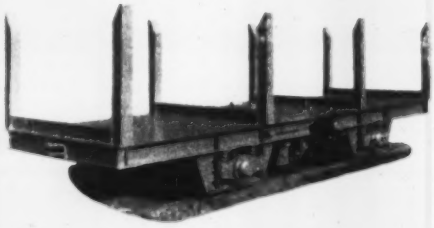
ATLAS CARS

Atlas Walk-Along storage battery operated flat cars show considerable savings over other methods of handling heavy, bulky loads over short distances. They are safe to use because operation is controlled by one lever and they travel no faster than a man can walk.

20-TON BATTERY OPERATED

The steel plate deck section over battery and charging equipment is removable for easy access. Plug-in connection to automatic battery charger on car is located conveniently at side of car next to ampere hour meter. Car moves at slow speed in direction controller lever is moved and stops when lever is released.



40-TON BATTERY OPERATED

This safety-type flat car is equipped with side stakes and cross bunks so that crane slings may be inserted to handle loads. Deck section is hinged to provide access to equipment, including automatic battery charger which may be plugged into plant circuit whenever car is at rest so that car is available for 24-hour service. Car can be furnished with plain deck, operator's platform, or other special features if required.

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

the furnace productive capacity and the fuel rate, is:

1. The opportunity afforded through ore beneficiation for changing the limitation to the furnace productive capacity from the shaft to the bosh and hearth, and

2. The opportunity for fuel economy through a greater recovery of latent heat from the top gas and its return with the hot blast to the bosh and hearth operation.

It is an interesting example of the swinging of time's pendulum that with operating conditions existing in Eastern district furnace operations using natural magnetite ores during the era of Cornwall furnace 200 years ago, the productive capacity of furnaces was limited by the smelting capacity of the bosh and hearth because of the limited facilities for delivering heat to the bosh and hearth with cold blast, but with the use of hot blast, the furnace hearths were enlarged to meet the preparation capacity of the shafts. With a further cycle of development in recent years, means for beneficiating natural magnetite ores (concentration and sintering) have been perfected to an advanced degree and in the few Eastern district furnaces having such preparation of ores the shaft work is greatly reduced, with a proportionate increase in the preparation capacity. Furthermore, the productive capacity of the combined operations is again limited by the smelting capacity of the bosh and hearth the same as it was 200 years ago, despite the use of high, but limited, blast temperature. During this 200-year cycle the principles of blast furnace operation have not changed, only conditions under which they are applied have changed.

(To be continued)

ASTE Meets in Southwest Area

American Society of Tool Engineers will hold its first Southwest area technical meeting in Dallas, May 30-31. Included in the session are three technical papers, a panel discussion on metal forming, two plant tours and a general area membership meeting.

Tool engineers from the Houston, Dallas, Wichita, New Orleans, Denver, Tulsa, Los Alamos and Albuquerque ASTE chapters are

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has over 50 years of experience in solving spring steel problems, to guarantee the quality of your product.

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co-operating in the meeting. V. V. Koodroff, tool supervisor, Chance-Vought Aircraft Co., is chairman of arrangements committee.

Machine Meets Fine Tolerances

Mackenzie-Walton Co. says it meets customers' exacting seamless tube specifications at its Pawtucket, R. I., plant with a rotary straightener made by Mackintosh-Hemphill Co., Pittsburgh. The machine takes largely 70-30 brass, from 0.175 to 0.500-inch OD, through its six power-driven rolls.

Tube firm reports an example of current work meets an 0.005-inch per foot straightness tolerance on tube that is 0.400-inch OD, 0.007-inch wall, 80,000-85,000 psi. Another size frequently processed is 0.298-inch OD, 0.282-inch ID. Straightener works 12-foot lengths and meets specification of 1/32-inch deviation. This tube, straightened at the machine's rated speed of 120 fpm, has tensile strength of more than 72,000 psi. Gage, instrument and electronics industries get the bulk of the company's output.

Plastics Makers Mark Advances

Molders of reinforced plastics look optimistically to the future for acceptance and growth of their product. This is the conclusion drawn from the seventh annual technical session, Reinforced Plastics Division, Society of the Plastics Industry Inc., held April 9-11 at the Edgewater Beach Hotel, Chicago. About 700 representatives of plastic molding firms, material supplier companies and the armed forces gathered to exchange information about reinforced plastics.

Rapid Growth — Conceived to perform vital military service during World War II, the industry has grown lustily during the post-war period. Today, it is doing an important dual job—in a broad range of consumer and industrial products and in many defense materials.

Reinforced plastic materials are made by embedding reinforcing material in plastic resin, which is molded into shape and allowed to harden. Polyester is the resin most commonly used at present, with phenolics, epoxys, silicones and

Good for many years at hard labor

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Now is the time to modernize your industrial machinery. For never before has American industry encountered such a challenge! Its double job of producing for defense and civilian needs demands plant machinery built stronger, to last longer.

York-Gillespie Manufacturing Company — designers and custom-builders of special machinery — and York Engineering and Construction Company form an unbeatable team working to develop and build machinery to fit your production requirements.

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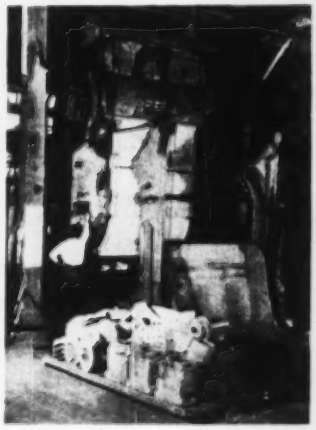

One-Man Operation

Installation of this 28-cu ft capacity Rotoblast barrel makes cleaning a one-man operation. Unit blasts 500 tons green work, 250 tons annealed castings each month, working 1500-2000 pounds per cycle. Manufacturer is Pangborn Corp., Hagerstown, Md.

Millions

THE FERRY CAP & SET SCREW CO.

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"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel—bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications—hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread and annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

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Here's what J&L Otiscoloy, the Transportation Steel, can provide

INCREASED PAYLOAD — Otiscoloy's high tensile strength permits the use of lighter sections without loss of strength — cuts equipment deadweight which allows for greater profit-paying cargo.

LOWER COSTS — Lighter sections with equivalent strength frequently make possible the production of 1/3 more units per ton compared with mild steel — result in 1/3 lower freight cost per unit — 1/3 less weight handled during production.

CORROSION RESISTANCE — Otiscoloy has 4 to 6 times greater resistance to atmospheric corrosion than mild steel — helps lengthen equipment service life — cut maintenance costs.

FATIGUE RESISTANCE — Otiscoloy has high resistance to fatigue — considerably greater than that of mild steel.

WORKABILITY — Otiscoloy can be easily welded or cold formed by any standard method.

J&L STEEL

It's no surprise builders and users of transportation equipment are turning to high-tensile J&L Otiscoloy to give them machines that require minimum maintenance — help increase income through reduced deadweight and greater payloads.

When you're looking for new ways to cut costs on your equipment, you'll also find it well worth your while to check further into the advantages of J&L Otiscoloy, the modern transportation steel. Why not write us for additional information *today?*

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

melamines also employed. Principal reinforcement is fibrous glass with tensile strengths in excess of 300,0000 psi.

Exhibit held in conjunction with the meeting emphasized not only the wide range of products made from reinforced plastics but also the trend toward larger moldings. The implication is that press builders have a promising market confronting them and as time goes on will be called upon to design bigger and heavier presses. A similar situation is ahead for makers and designers of dies.

Variety of End Uses—Included in the larger moldings of reinforced plastics for civilian use were washing machine agitators and spinners, tanks for chemicals and acids, housings and other parts for motors and machinery, skis and even coffins, as well as structural building materials. Two custom automobile bodies also were shown. The armed services are claiming substantial amounts of reinforced plastics for more than 125 separate end uses. Air Force needs are particularly great for the high-strength low-weight material in ducting, bulkheads, radomes, self-sealing tanks and instrument housings. Navy and Coast Guard are actively interested in these plastics for small boats, pontoons, pipe for carrying salt water, etc.

According to James Slayter, vice president of charge of research, Owens-Corning Fiberglas Corp., total tonnage of reinforced plastics used during 1951 was 10,000 tons, or 1 per cent of total aluminum capacity. He maintains that volume eventually will reach to half of the steel market—50 million tons. This would be 16.6 million tons of plastics. At present state of development, reinforced plastics weigh one-third that of steel and two-thirds that of aluminum.

Film Shows Chuck and Uses

Skinner Chuck Co., New Britain, Conn., announces release of an educational color movie titled, "Chucks and Their Uses." This 16 mm Kodachrome sound film is on a single 1200-foot reel, with a running time of 30 minutes.

Scenes include a complete showing of parts, construction, mount-

Angier

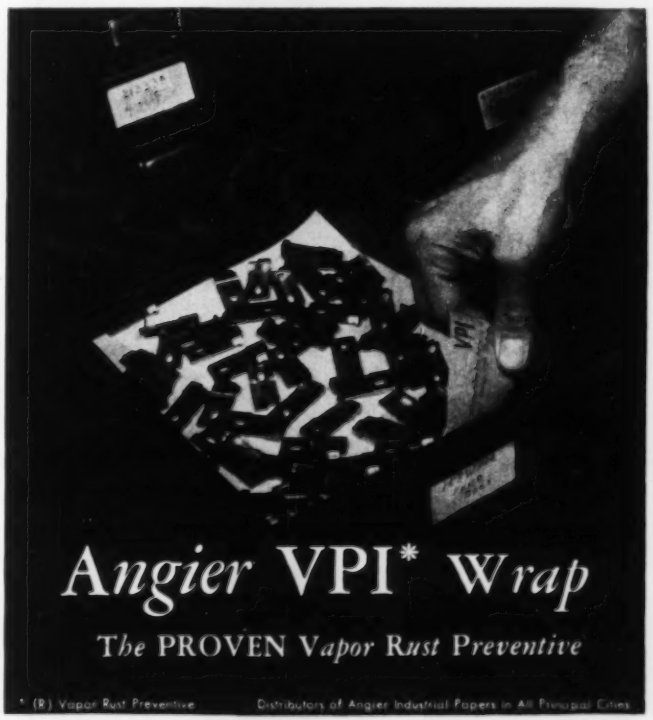
How Vapor from Paper Stops Rust of Parts in Storage

Problem: To find a simple way to keep sewing machine attachments bright and shiny in a plant atmosphere that accelerates corrosion for two reasons. (1) Certain manufacturing operations create acid fumes and (2) the plant is located at the ocean's edge.

Solution: The firm discovered the chemical coated paper that gives off a vapor to stop rust—Angier VPI* Wrap. The paper is used simply as a liner for drawers (see photo), for trays, boxes or bins—or as envelopes. The vapor permeates the area in the container and robs aid and moisture of its rust-making powers. Now the shiny machine attachments stay bright for months at a time. No refinishing is necessary for these VPI-stored parts in process or for completed parts that are ready to ship.

To get "VPI Facts", check below the products stored or shipped by you. Send today to the most experienced name in vapor rust preventives—Angier Corporation, Framingham 8, Mass.

- ☐ Machinery-Industrial, Metal Working, Farm, Office, Construction.
- ☐ Steel in process of fabrication.
- ☐ Electrical Machinery, Appliances, Products.
- ☐ Instruments and clocks.
- ☐ Fabricated Products—Cutlery, Hardware, etc.
- ☐ Ordnance Equipment.
- ☐ Transportation Equipment—Aircraft, Auto, Naval, Railroad, etc
- ☐ Others:



Angier VPI* Wrap

The PROVEN Vapor Rust Preventive

* (R) Vapor Rust Preventive — Distributors of Angier Industrial Papers in All Principal Cities

ing and use of independent, universal scroll and power chucks. Studies are made of stresses and strains using a 10-inch plastic chuck photographed under polarized light; spindle noses and mounting and tests for runout and balance.

Included is a scene that reviews horsepower requirements of modern machine tools and design and application of machine vises. Film is available for showing without charge to qualified groups.

Quick Test for Copper Content

Scarce alloying metals are considered in high-strength structural steels prepared for compliance to special or emergency specifications by use of steel scrap alloy content. This requires rapid methods of analysis so composition of the steel bath can be determined and adjustments in composition and treatment planned during the melt.

One element frequently used as an alloying constituent is copper, both to increase strength and improve resistance to atmospheric corrosion.

One-Step Procedure—Though a number of accurate chemical methods are available for determining copper in steel, a one-step procedure has been lacking. This need appears to be met by a photometric method developed recently by National Bureau of Standards.

In this method, the sample is first dissolved in dilute nitric acid. (High-chromium steels take a mixture of nitric and hydrochloric acids.) A sulphuric-phosphoric-perchloric acid mixture is added, and the solution evaporated until fumes of sulphuric acid are given off. Use of the sulphuric-phosphoric acid mixture provides complete solution of tungsten tool steels.

Solution is diluted and addition of citric acid makes it slightly ammoniacal. Sodium salt is added as a complexing reagent, and sodium diethyldithiocarbamate is also added to form a copper complex. Complex is extracted with butyl acetate, and the acetate extract is washed with diluted sulphuric acid to stabilize the complex. Optical absorbancy of the copper complex in the butyl acetate layer is meas-

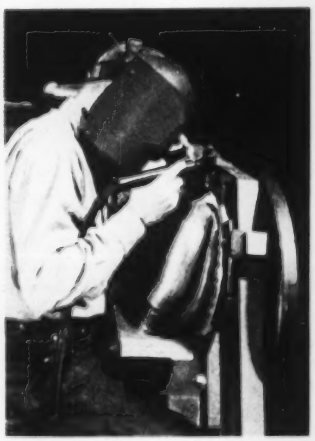
GLOBE

SUPERIOR LADLE BRICK

Here is a plain statement without any frills: you can increase your melting capacity if you use GLOBE SUPERIOR LADLE BRICK. This statement has to be proved, of course, before it can be accepted at face value. Well, it's proved every day in steel plants all over the country. Here's how it works: the labor and materials used for refractory replacement are a terrific drag on production time. The excellent quality of GLOBE SUPERIOR LADLE BRICK, wire cut or dry pressed, makes it last longer. By lasting longer, it salvages much of the time lost in refractory replacement. The result, of course, is increased melting capacity. Let us help you select the right type of GLOBE SUPERIOR LADLE BRICK for your particular needs. You'll find it quite profitable.

SERVING THE STEEL INDUSTRY SINCE 1873

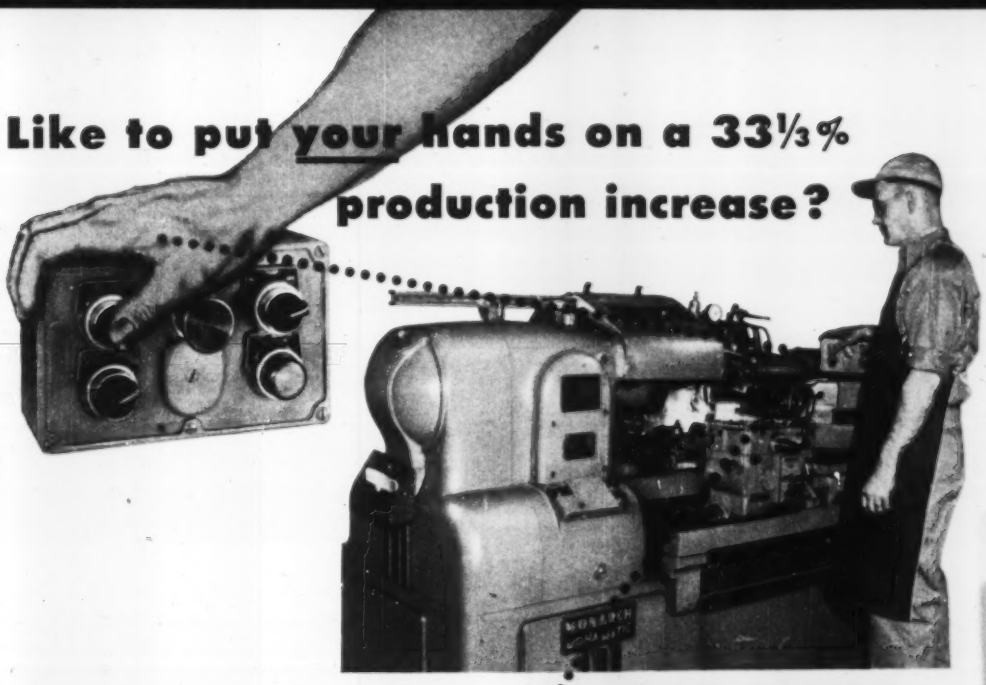
The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO



Tungsten, Gas Saver

Operator at McGregor Mfg. Corp., Birmingham, Mich., uses internally-cooled inert arc welding torch to weld an Inconel part on an aircraft engine's power recovery turbine. Company reports General Electric torch cuts gas consumption about 25 per cent and curtails tungsten consumption

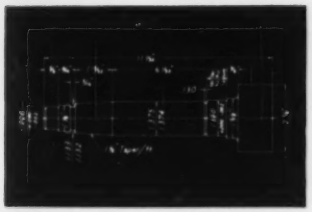
Like to put your hands on a 33⅓% production increase?



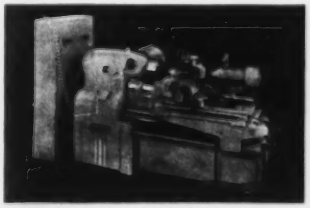
Since the Milwaukee Gear Company installed their first completely automatic cycle Monarch Mona-Matic several years ago, an *overall* turning production increase of 33⅓% has been recorded.

An interesting point is that this machine is used for a large variety of work in relatively small lots—proving again that for accuracy, for rate of output and for ease and speed of setup, the "Air-Gage Tracer" controlled Monarch Mona-Matic just can't be equaled. Now, a second Mona-Matic has been installed by this user. On many jobs, one man can operate both machines, practically doubling the original increases.

Even greater time reductions are recorded here on specific jobs (see details, right). Results like these are typical of all Mona-Matic installations, whether the runs are short or long. The proved efficiency and economy of the Monarch tracer controlled running tool deserves your serious consideration. So let us give you the complete Mona-Matic story. Write for illustrated booklet No. 1804 . . . . . *The Monarch Machine Tool Company, Sidney, Ohio.*



Part—pinion. **Material**—SAE 4615. **Operation**—turn (both rough and finish) from 2⅞" bar stock, using three cuts because of amount of metal which has to be removed. Rear slide tools simultaneously form two necks. **Production Increase**—60% for a run of 320 pieces. This includes setup time and is secured on a *single* Mona-Matic. Because of superior Mona-Matic accuracy, subsequent grinding time is materially reduced.



Monarch

ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio

Gentlemen: I am interested in your Mona-Matic story and would like to receive your illustrated Booklet, with complete data and job performance reports. Please send me your Booklet 1804 without obligation.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

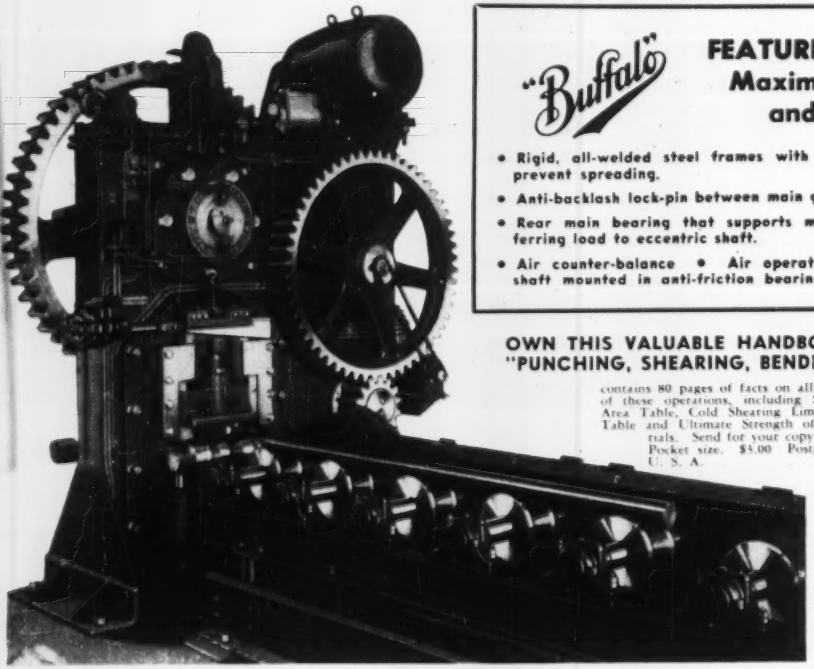
CITY _____ ZONE _____ STATE _____

"Buffalo"

Tips on Shearing

Selecting The Right BILLET SHEAR

1. DETERMINE CAPACITY REQUIRED—choose a shear that is not only adequate for present, but also any foreseeable future needs. This can save you money in the long run.
2. HOT OR COLD SHEARING? Tough and brittle alloys must be heated or they will crack and shatter under pressure.
3. CONSIDER NATURE OF MATERIAL TO BE SHEARED — specify tensile strength and Brinell hardness.
4. GIVE ALL INFORMATION on knife openings—shape of material to be sheared—electrical characteristics for motor and controls—any extras required for the production and service you must have (such as power feed table, automatic hold-down, cut-off gauge, etc.)
5. INSIST ON TROUBLE-FREE DESIGN. Shear shutdowns are expensive. Sturdy, rigid design for the intended shearing service will pay over and over in uninterrupted production.



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FEATURES That Insure Maximum Stability and Service—

- Rigid, all-welded steel frames with ties through plunger to prevent spreading.
- Anti-backlash lock-pin between main gear and clutch.
- Rear main bearing that supports main gear without transferring load to eccentric shaft.
- Air counter-balance • Air operated hold-down • Drive shaft mounted in anti-friction bearings.

OWN THIS VALUABLE HANDBOOK!
"PUNCHING, SHEARING, BENDING"

contains 80 pages of facts on all phases of these opetations, including Sheared Area Table, Cold Shearing Limitations Table and Ultimate Strength of Materials. Send for your copy today! Pocket size. $5.00 Postpaid in U. S. A.

"Buffalo" No. 11 Billet Shear with automatic feed table. Machine shears 4½" rounds.

"Buffalo" MACHINE TOOLS

BUFFALO FORGE COMPANY

158-MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING CUTTING BENDING

ured in a colorimeter at 560 to 600 mu, and amount of copper is read from a calibration curve or table.

A single determination can be made in about 30 minutes; a set of eight can be completed in about two hours.

Reliability and accuracy of the process were checked by making several determinations on various standard iron and steel samples. An accuracy of 0.001 per cent of copper was indicated for samples containing less than 0.05 per cent of the element. All average values obtained for samples containing 0.05 to 0.25 per cent copper were within 0.005 per cent of the certified value.

Nickel content of the sample does not interfere in the analysis. This constitutes an additional advantage of the new procedure, because many copper-bearing steels also require presence of nickel in the alloy. Stainless and corrosion-resisting steel, nickel-base casting alloys and tool steel can be analyzed for copper content at similar speeds.

GE Offers Gear Motor Bulletin

Eight-page, two-color bulletin on fractional-horsepower gear motors, listing 61 standard models, is available from General Electric Co., Schenectady 5, N. Y. Designated GEA-5678, the publication describes applications and outlines a simple method of determining correct horsepower requirements with the use of an ordinary pipe wrench and fish scale.

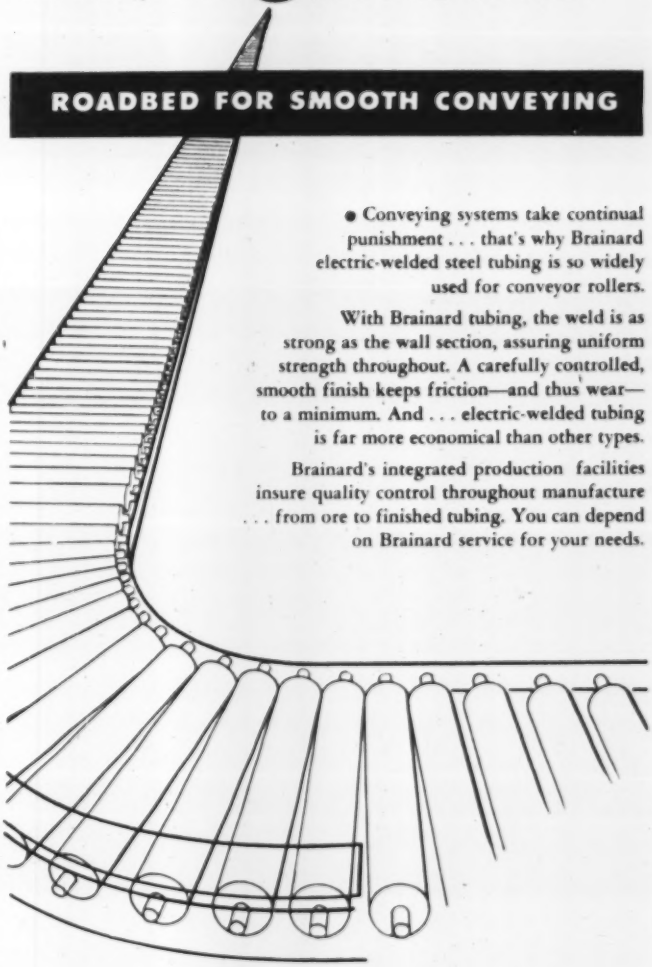
Bulletin contains descriptions, cut-away drawings, selection charts and dimension tables for concentric and right-angle shaft gear-motors, includes a section on maintenance pointers, and lists GE apparatus service shops throughout the country.

Grinding Wheel Truing: 1910-51

Revised edition of the bibliography, "Truing of Grinding Wheels from 1910 to 1951," is announced by Industrial Diamond Information Bureau, Industrial Distributors Ltd., London. Formerly a leaflet, this material has expanded to 36 pages, including a name index showing bibliography page reference, source and year published for each citation included. Book is

another job for Brainard TUBING

ROADBED FOR SMOOTH CONVEYING



• Conveying systems take continual punishment . . . that's why Brainard electric-welded steel tubing is so widely used for conveyor rollers.

With Brainard tubing, the weld is as strong as the wall section, assuring uniform strength throughout. A carefully controlled, smooth finish keeps friction—and thus wear—to a minimum. And . . . electric-welded tubing is far more economical than other types.

Brainard's integrated production facilities insure quality control throughout manufacture . . . from ore to finished tubing. You can depend on Brainard service for your needs.

EASILY FABRICATED

Brainard tubing is a uniform product made to close tolerances. Has good machining qualities and finish can be supplied as specified. Easily fabricated—can be beaded, expanded, swaged, spun, flanged, upset, grooved, fluted, flattened, tapered, and otherwise formed. Supplied straight or fabricated, sizes ½" to 4" O. D.; .025 to .180 gage.

Fast delivery on certain sizes. For further information or catalog, write Brainard Steel Division, Dept. N-4, Griswold Street, Warren, Ohio.

Brainard
STEEL DIVISION

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NEW

NEW from SKF

the HESS-BRIGHT "SY" UNIT PILLOW BLOCK

A new Unit Pillow Block, designed by SKF to meet tomorrow's needs of modern industry.

Here are the design features:

- SKF Red Seal, made of DuPont Fairprene, retains lubricant. Wiping action of the seal against the inner ring is practically frictionless.
- Rotating flingers exclude dirt.
- Set screws for ease of installation.
- Spherical outer ring compensates for initial misalignment.
- Alemite fitting for re-lubrication.
- Interchangeability with existing installations made possible by bolt hole spacing and center height features.
- Shaft diameters 1¾" to 2 15/16".

NEW
NEW
HESS-BRIGHT
SY
Hess Bright
Pillow
Blocks
From now on, the name to remember in Unit Pillow Blocks is HESS-BRIGHT "SY"—manufactured in our plants, to the same high quality standards as all SKF products. Ask your SKF Distributor to show you the HESS-BRIGHT "SY"; or write SKF direct for complete information on this *newest* Unit Pillow Block.
SKF INDUSTRIES, INC., Philo. 32, Pa.
—*manufacturers of* SKF *and* HESS-BRIGHT *bearings.*
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BALL AND ROLLER BEARINGS
IN EVERY INDUSTRY, SKF

ENGINEERS

TO DESIGN, REDESIGN OR DEVELOP YOUR PRODUCT

ENGINEERS

TO TOOL AND EQUIP YOUR PLANT FOR THE BEST PRODUCTION ECONOMICS

ENGINEERS

TO GET YOUR NEW PRODUCTION GOING AND KEEP IT GOING

ENGINEERS

TO REDUCE YOUR COSTS AND IMPROVE YOUR QUALITY

ENGINEERS, DESIGNERS, CONSULTANTS AND PRODUCTION SPECIALISTS

PIONEER ENGINEERING & MANUFACTURING CO., INC.

19662 JOHN R STREET
DETROIT 3, MICHIGAN

INQUIRIES PROMPTLY ANSWERED

arranged according to years and articles are marked to indicate the problem they consider.

NPA Outlines Diamond Salvage

Steps that industrial diamond consumers can take to promote the nation's conservation and salvage program are outlined in a publication released by U. S. Department of Commerce. Booklet, "Salvage Industrial Diamonds for Defense," is available free from commerce offices in New York, Buffalo, Albany, Rochester and Syracuse, N. Y., and Newark and Trenton, N. J.

Crisis in the diamond supply (STEEL, Apr. 14, pp. 60 & 97) resulted when peak consumption outran normal supplies. And indications are that these supplies will continue only at present levels. Situation is complicated further by the nearly complete U. S. dependence on foreign sources of supply.

Booklet was prepared by industrial diamond industry representatives, in consultation with the National Production Authority. It offers suggestions for obtaining maximum benefits from available materials and emphasizes that about 50 per cent of all diamond bort incorporated into new grinding wheels can be salvaged for further use.

ASTE Talks Diamond Standards

New standards for industrial diamonds, including specifications, tool holder types and nomenclature, should promote standardized practices and may result in substantial conservation. This is the hope of a committee initiated by American Society of Tool Engineers, now working to develop standard practices that will effect the necessary increase in efficiency.

Meeting called recently by ASTE's national standards committee in Detroit was attended by 25 association, industry and government representatives affected by the shortage of industrial diamonds. Spokesmen were present from ASTE, National Machine Tool Builders Association, Joint Industry Conference, Industrial Diamond Association, Grinding Wheel Institute, Ford Motor Co. of Canada, Universal Products Co., Na-

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*4 Strategic Locations**

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STEEL COMPANY

FIRST NATIONAL BANK BUILDING
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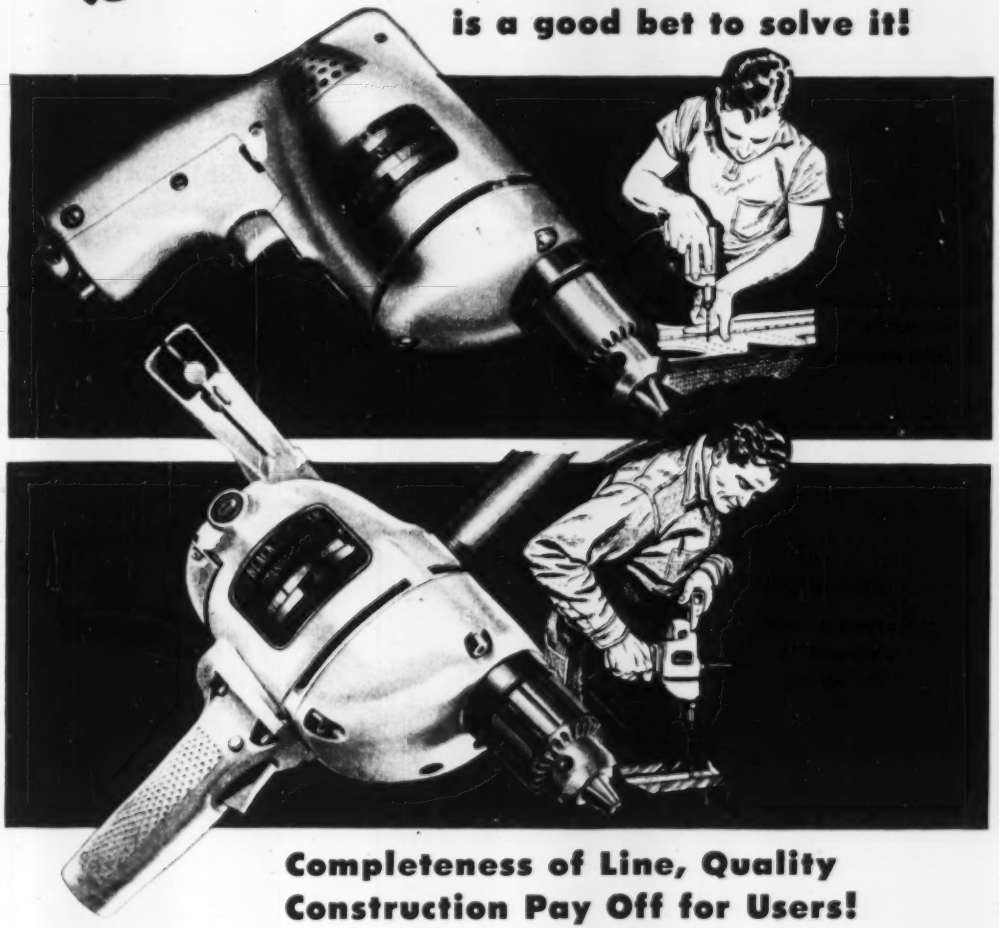
*Works: Ambridge, Pa. • Chicago, Ill.
Newark, N. J. • Putnam, Conn.

Drilling Problem?

Black & Decker's Drill Line is a good bet to solve it!



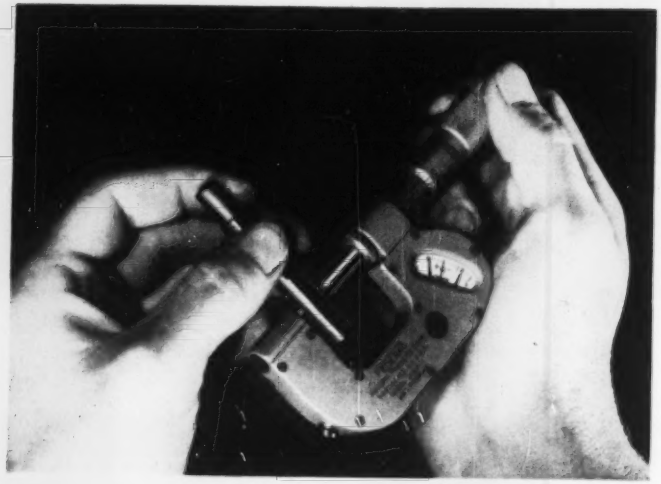
Completeness of Line, Quality Construction Pay Off for Users!

FOR drills to fit your needs—for top performance on any portable drilling job—it pays to check Black & Decker *first!* That's because Black & Decker gives you an unmatched choice of Drill models. Capacities from ¼" to 1¼"—choice of handle arrangement for easiest operation—choice of speed, power and price in most capacities. And it's also because Black & Decker Drills give you powerful B&D-built motors—full ball-bearing construction—extra-tough gears, shafts and chuck spindles—husky housings, streamlined design, perfect balance.

Whether your problem is in production, maintenance or construction—whether it requires large or small drills—see your nearby B&D Distributor *first* for expert help. And write today for free, detailed catalog to: THE BLACK & DECKER MFG. CO., 620 Pennsylvania Ave., Towson 4, Maryland.

B&D

WORLD'S LARGEST, MOST COMPLETE LINE



the double-duty micrometer!

You're in for a real surprise the first time you use a Federal MIKEMASTER! You'll be amazed at the honest-to-goodness convenience and downright accuracy of this *indicating micrometer*. You'll like its double-usefulness, too—the way you can use it as an *indicating snap gage* for measuring duplicate parts.

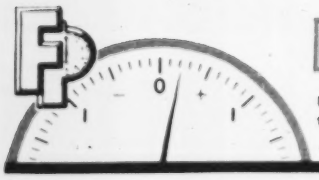
Here are the *big* features that make this tool far superior to regular old-style "mikes":

- **BUILT-IN DIAL INDICATOR** with clear graduations and easy-to-set Tolerance Hands for quick size checking down to a .0001".
- **CONSTANT ANVIL PRESSURE** that eliminates errors of "feel" . . . insures the same high accuracy no matter who is measuring with the Mikemaster.
- **RETRACTABLE LOWER ANVIL** for easy (non-scratching) insertion of workpieces when checking duplicate parts or inspecting for taper and roundness.

You have to handle the Mikemaster yourself to fully appreciate what it can do for you. *Write for a free demonstration.* FEDERAL PRODUCTS CORPORATION, 1214A Eddy Street, Providence 1, R. I.

Actual test proves the MIKEMASTER eliminates errors of "feel":

Four people, using a high grade conventional micrometer, measured the same diameter on the same piece three times. All measurements differed from .0002" to .0008". Only one measurement was correct. With the Mikemaster in a similar test, *all measurements but one* were exactly "on the nose" and this one showed less than .0001" variation.



FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES.

tional Diamond Laboratories Inc. and Naval Ordnance.

The conferees agreed that initial progress toward standardization can be made now by developing diamond tool holder standards and nomenclature. Committee was named to list all tool holders used by machine tool builders and draft a suggested nomenclature standard. J. C. Brenner, manufacturing engineer, Sperry Gyroscope Co. and ASTE representative, is committee chairman.

Insulation Tips Cut Heat Loss

Insulation maintenance is a neglected factor in many plants and often leads to costly heat losses or operating inefficiencies. So says Magnesia Insulation Manufacturers Association, pointing out that the need for maintenance may result from normal wear and tear, from failure to repair or replace insulation damaged or removed during alterations, or from routine equipment maintenance work.

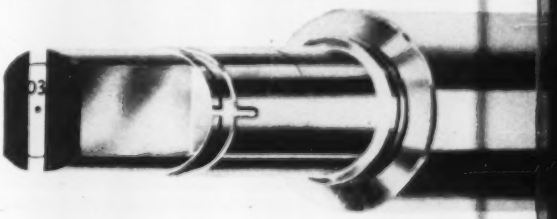
Giving specific examples, the association reports most frequent need for insulation repair on pipe lines can be noticed around flanges and fittings opened for inspection or other purposes. Pipe insulation adjacent to chain hoists, doors or other moving objects may be damaged if not properly protected. Loose tie wires or bands and damaged canvas covering should be checked and repaired. Small fittings insulated with cement are more likely to need periodic reinsulation than pipes and larger fittings having molded insulation.

Equipment is likely to show most need of insulation repair, the magnesia producers say, around manholes or other openings where edges are subject to hard contact and abrasion. Vibrating or rotating equipment, when insulated, should be checked frequently to assure soundness of fastenings. Loose tie wires or sheared stud welds may allow insulation to sag or become completely detached.

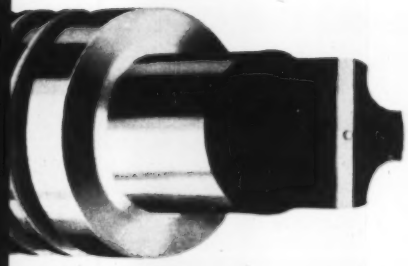
One factor causing neglect of insulation maintenance, it is stated, is the need for stocking insulation materials of various types and sizes such as blocks, pipe sections, cement, canvas, wires and bands. For those who

Up-to-date as a...

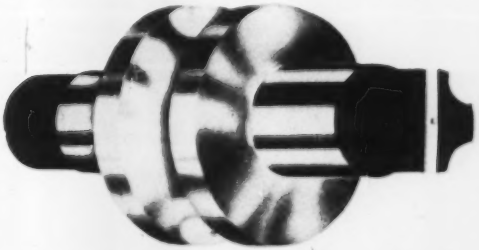
that's how Mack-Hemp's rolls with the *striped red wabblers* are—the latest thing in metallurgical developments and productioneering practice.



The skillful mill operators who make strip or pipe or wire or plate find that Mack-Hemp rolls are equal to the task, and then some.



Because Mack-Hemp keeps pace with modern trends in rolling mill practice, it's important for you to keep your eye on what's new and different at Mack-Hemp.



MACKINTOSH-HEMPHILL
COMPANY
Makers of the Rolls with the Striped Red Wabblers
PITTSBURGH AND MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: rolls . . . steel and special alloy castings . . . completely integrated strip mills . . . heavy duty engine lathes . . . Mackintosh-Hemphill rotary straighteners . . . improved Johnston patented corrugated cinder pots and slag-handling equipment . . . shape straighteners . . . end-thrust bearings . . . shears . . . levellers

prefer to do their own insulation maintenance, a 96-page manual describing and illustrating techniques is available from the association, 1317 F St., NW, Washington 4.

Press Facts Presented

A revised issue of "Computations for Metal Working in Presses" has just been issued by E. W. Bliss Co. This 52-page compilation of engineering data, first printed a number of years ago by Bliss, is broadened to assist industry at a time when speed in planning and layout is vital to production. Volume contains necessary data to compute pressure capacity and sustained work capacity of various mechanical and hydraulic presses.

A series of alignment diagrams for ease in making these computations is prepared from such formulas as could be developed. Some of the formulas are theoretically accurate. Others are empirical, or are approximations which are sufficiently close for engineering purposes.

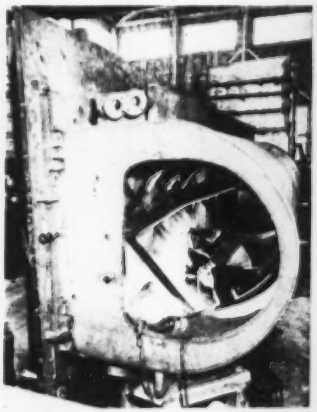
Copies of bulletin 38 can be obtained by writing to E. W. Bliss Co., Canton, O.

Antirust Paint Uses Shown

Application bulletin containing information on selection and use of antirust paints for all metal surfaces is announced by Paint Corp. of America. Bulletin No. L-4285 describes chemical properties of antirust paints and discusses methods of application. It also explains how and when to use colored finish paints over antirust paints. Publication will be sent free by the company, Fidelity Bldg., Cleveland 14.

Condenser Welding Time Cut

Welding time on large turbine condensers at its Sunnyvale, Calif., plant is cut 70 per cent by condenser positioning, reports Westinghouse Electric Corp. Originally all



TURBINE CONDENSER WELDING
. . . time cut by two-position method

welding operations were performed with the condenser in one position. Results were satisfactory, but the all-position welding was time-consuming.

Work now is placed first on one side, then the other, eliminating all vertical and overhead work. Condenser, plus a strongback that weighs about 35 tons, is positioned with an overhead crane having an auxiliary hook to hold the unit in its balanced position while cribbing and blocking is moved into place.

By positioning for down-hand

FOR SIDEWALLS
AND ARCH STONES
BUCKEYE
Is best and
most economical!
Leading steel mills have used Buckeye Silica Firestone for years. Their production men know the vast difference between this natural refractory and other types for meeting the severe operating demands encountered in modern soaking pits.
Buckeye Silica Firestone offers definite savings in fuel costs because of its better heat-retaining ability. Due to its greater mechanical strength, it lasts longer . . . there is less need for repairs. Buckeye Silica Firestone is the best buy obtainable per ton of ingot heated.
Every assistance will be given by "C Q" engineers to bring you the advantages of Buckeye Silica Firestone. Ask for this service which is given at no obligation.
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Send for full information today, no obligation
BUCKEYE
"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE

in WIRE ROPE, too specialized use calls for the RIGHT KIND of muscle

Tough, wiry muscles stand the Rocky Mountain Bighorn in good stead; give him the sure-footed agility he must have to survive on almost impassable heights.

In wire rope, too, the right kind of muscle is mighty important... because different uses present different problems of wear and tear. Bending fatigue. Abrasion. Shock stress. Load strain. Each requires wire rope with the right construction and lay; the right grade of steel and size of wire to best withstand the destructive forces encountered.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the proper combination of physical properties for long-lasting, reliable service on your particular job.

THE COLORADO FUEL & IRON CORPORATION — Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION — Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

WICKWIRE ROPE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

IF THE PART IS TUBULAR—

DRAW ON THE SPECIALIZED FACILITIES OF WOLVERINE TUBE and PRODUCE IT IN MINIMUM OF TIME and WITH MINIMUM MATERIAL!

Today, when materials must be conserved—especially copper—and there is a never-ending cry for needed products, making speed in production also an important factor—there is a distinct advantage in producing tubular parts the Wolverine way.

Many steps in production have been saved in this way—in several instances, material has been reduced and a number of operations have been eliminated. That meant a two-fold saving. Moreover, some of the resulting new designs have also proved more functional.

The products shown here are a few taken at random from our voluminous file to give you an idea of the wide range of the fabricated tubular parts we have developed. By availing yourself of our specialized experience, you can save yourself many false moves and arrive at the solution to your particular problem quicker and more conveniently.

No obligation to call in our engineers.

WOLVERINE TUBE DIVISION

Calumet and Hecla Consolidated Copper Company
INCORPORATED

Manufacturers of seamless, nonferrous tubing

1439 Central Avenue • Detroit 9, Michigan

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
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welding, large electrodes can be used and fewer passes are needed for each joint. This means not only a higher deposition efficiency, but less time spent cleaning away slag between passes. In addition to time saved, the welding job presents a more uniform appearance throughout. Some of the welders' cramped and uncomfortable positions are eliminated, making the work less fatiguing.

New Spec Rules Military Boxes

Wirebound Box Manufacturers Association calls defense contractors' attention to the fact that MIL-B-107A specification for wirebound boxes for overseas defense shipment supersedes the old JAN-B-107 specification.

The association cautions that containers made under the old specification are no longer acceptable regardless of the wording in government contracts or bid invitations. They add that some procurement offices continue to stipulate JAN-B-107 boxes, apparently being unaware that the new specification is in effect.

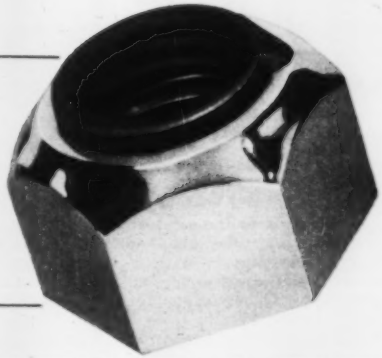
New specification leaves construction of some sizes or types of boxes almost unchanged from what they were under the old order. However, many others must be made more strongly than before.

Welding Training Can Cut Costs

Lincoln Electric Co., Cleveland, says it is starting a training program for engineers that should make possible a sizable reduction in the cost of making machinery. Another reduction is claimed possible in over-all weight of machines. The company says it developed information that constitutes a new approach to the use of welding in machine design.

Principle of the firm's Weldesign system is a guide to deciding type and shape of material to use, where to place it for maximum benefit and lowest cost methods of fabrication for final design. Check points help prevent bad design and costly methods. Long calculations ordinarily involved in designing are either shortened or eliminated, say company engineers. Training program will be available in principal cities by the company's field engineers.

★ *"It is believed that the Locknuts received a more severe test than they would have received under service conditions and that the stresses set up by the direct hammer test would have sheared a cotter pin."*



INVESTIGATE

The Statement Above!

That statement is not ours. It is the statement in a report on a grueling and authoritative test made on Security Locknuts.

If you have been disappointed in the performance of ordinary locknuts and have a vibration problem we would like to show you the whole report from which the above statement was taken.

You will find that—

- Security Locknuts stay put where you wrench them regardless of vibration that may destroy the bolt itself.
- They are self-locking. They do not require bolt tension but stay where they are set.
- They can be adjusted or reapplied any number of times without losing locking power or impairing threads.
- They require no more time to install than an ordinary nut—no extra parts or operations—nothing to line up—nothing to shear.

The picture above shows a cross-section of a Security Locknut. The insert, indicated removed, is of high quality heat treated, alloy spring steel and becomes a permanent part of the nut.

The insert is elliptical in shape and this design causes the retainer to grip the bolt with the terrific tension that only spring steel of great strength could exert and prevent the nut from turning. Simple—dependable—positive!

Once in place no Security Locknut has ever been set spinning. We want you to challenge us to solve your toughest fastener problem. There is a size for the job—$\frac{3}{8}$" to 3". Let us show you the report on Security Tests. Fill out and send the coupon.

SECURITY LOCKNUT CORPORATION

North Ave. and 15th Ave. Melrose Park, Ill.

Security

The Nut You Can't Shake Loose

SPECIAL OFFER! Here's an easy way to arrive at thread tolerance figures. Ask for a Security Thread Tolerance Chart. Just spin the dial and you have the figure you need. Send the coupon. It's yours for the asking.

SECURITY LOCKNUT CORPORATION S
North Ave. and 15th Ave., Melrose Park, Ill.

Please send me without obligation:

☐ One of your Thread Tolerance Charts.

☐ We have a fastener problem and would like to know more about Security Locknuts.

Company Name

Address

Town Zone State

Signed

New Books

How to Sell to Industry

SELLING TO INDUSTRY, by Bernard Lester; cloth, 255 pages, 4½ x 6⅞ inches, published by Industrial Press, New York, for $3.50; available from STEEL, Penton Bldg., Cleveland 13, O.

This pocket-size book is a manual of practical ideas and suggestions for the sales engineer who wants to analyze and improve his methods of finding, contacting, selling and servicing industrial customers.

In his introduction the author states, "Selling any prospect effectively does not follow a beaten path. Prospects and salesmen vary in temperament, habits and interests. Products sold differ and new problems in their application and use continually crop up. But success in selling is not a haphazard affair. Proper preparation and orderly enthusiastic procedure are necessary." Then he sets forth in a brief and realistic way the key points that have from experience been found most effective.

Case histories are used to illustrate various points. Mr. Lester describes specific situations that he encountered and discusses methods of handling them. He gives factual, result-getting ideas that can be applied in selling industrial machinery or equipment.

Proper Design of Hoods

EXHAUST HOODS, by J. M. Dalla Valle; cloth, 146 pages, 6 x 9 inches; published by Industrial Press, New York, for $3.50; available from STEEL, Penton Bldg., Cleveland 13, O.

Comprehensive information is given in this book on the flow of air around and into the openings, hoods or slots in exhaust ventilating systems. Originally published in pamphlet form as a report of the author's research into the subject, basic material has been co-ordinated with data by other investigators. New chapters and many new drawings and photographs have been added to the original work.

Increased emphasis on industrial health in plants where harmful and dangerous dusts, vapors, gases or fumes are generated has resulted in a demand for accurate design of exhaust system of which the hood is a most critical part. The author tells how to determine required air volume and velocity for hoods and other type openings for control of all kinds of dusts, fumes and gases. Sample problems with solutions worked out in detail are given in one chapter.

Subject has been organized into chapters in accordance with hood types rather than specific applications. Illustrations include photographs of actual hoods applied in specific problems.

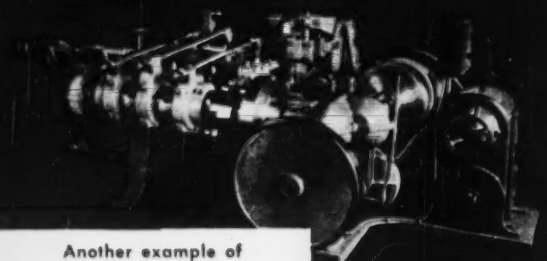
Principles of Hardenability

ELEMENTS OF HARDENABILITY, by M. A. Grossmann; cloth, 164 pages, 6 x 9 inches; published by American Society for Metals, Cleveland, O., for $4.50; available from STEEL, Penton Bldg., Cleveland 13, O.

This book deals with the quantitative aspects of hardenability and the principles underlying them. The first chapter discusses the hardenability tests starting with the early test, P-F test, U-curve for hardness distribution, Rockwell inches, Jominy test, variations of the Jominy test, cone, bomb, insert, wedge and P-V tests. It also covers air hardenability, critical size and effect of severity of quench on critical diameter. Nature of hardening and quenching process are discussed in chapters II and III.

Effects of alloying elements on hardenability are dealt with in the final chapter. This includes: General principle for calculation of hardenability, limitations of the method, reliability decreases as hardenability in-

PRODUCTION RECORDS *Broken* with NILSON 4-SLIDE *Machine!*



Another example of
FASTER, LOWER COST FORMING
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★ 180 Terminal Contacts Per Minute

★ 7 Separate Operations Eliminated

A famous national manufacturer tripled production of the Terminal Contact illustrated above (in actual size) and reduced production costs proportionately by replacing several progress die set-ups with one Nilson 5-3-F four side machine. *Seven separate operations were eliminated;* 180 completed contacts produced per minute. Time required for tooling changes was reduced 50% over similar type machines.

This example clearly shows the big savings you can make in overhead, maintenance, labor and time with a Nilson 4-slide!

Taking stock directly from the coil, NILSON metal ribbon stock four-slide machines automatically feed, straighten, pierce, blank, swage, stamp, coin, cut off and perform up to five forming operations with speed and accuracy. Built in five models with capacities up to 2½" wide and feed lengths up to 15". For specific recommendations on your wire and ribbon metal forming problems, send details, prints or samples of your operation to us when you request the bulletin.

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THIS man is a Pitt Chem corrosion engineer. His job is an important one—to show maintenance engineers how to add years of life to hard-to-replace equipment with Pitt Chem Tar Base Coatings.

These versatile coatings are derived from coal tar pitch, one of our most impervious materials. They're low in cost, easy to apply, and their heavy film—up to ten times as thick as ordinary paint—provides an impenetrable barrier to most mineral acids, alkalis, corrosive vapors and atmospheric conditions.

You can depend on Pitt Chem Tar Base Coatings for top uniform quality because we control every phase of production from coal to finished coating. That's your assurance of top-grade application characteristics, uniform bond and maximum protection. ● More information, or field application assistance will gladly be sent on request.

PITT CHEM 101
A versatile, heavy duty coating that withstands severest corrosive conditions.

PITT CHEM 102
A thin, high gloss maintenance coating for steel and concrete surfaces.

PITT CHEM 103
A heavy duty coating for metal exposed to corrosive vapors, dilute acids and alkalis.

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A fast drying, high gloss coating for equipment handling potable water.

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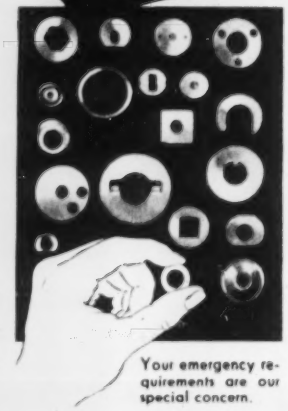

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Your requirements for standard and special steel washers are sure to be satisfied at Joliet. A bank containing thousands of special dies in many shapes and forms, 9/32" to 8" O.D., gauges No. 28 to 3/8", stands ready to answer your needs. A VARIETY OF FINISHES IS AVAILABLE to meet your special needs, including: Electro-plating, Galvanizing, Parkerizing, and Cyanide hardening.

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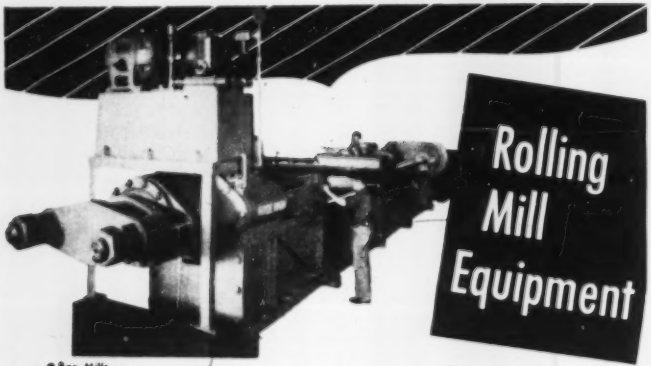

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creases, individual factors, carbon and manganese, grain size, phosphorous, sulphur, silicon, nickel, aluminum, factors for the carbide-forming elements, chromium, molybedenum, vanadium, titanium, boron, copper, cobalt, zirconium, columbium and tantalum, tungsten, tin, uranium, lead, arsenic, antimony, beryllium, tellurium, germanium, hydrogen, oxygen and nitrogen.

Application of Strain Gages

STRAIN GAUGES, Theory and Application, by J. J. Koch and associates; cloth, 95 pages, 5½ x 8½ inches; published by Philips Technical Library, Netherlands, available from Elsevier Press Inc., Houston, Tex., for $2.75.

This book deals with the theory and practical application of strain gages and of the accessory measuring instruments. General description of strain gages and measuring instruments is given. This is followed by a thorough discussion of the gluing and connecting of gages and proceeds to deal with working out an interpretation of values measured. In strain measuring, the state of tension in a structure plays an important part and when the state of tension at one point is known it must be determined whether it may be dangerous for the material. In connection with this, various hypotheses on fracture are dealt with in the book, showing how strain measurements can be worked out when taking state of tension of material into account. Gages are also used for determining mechanical qualities.

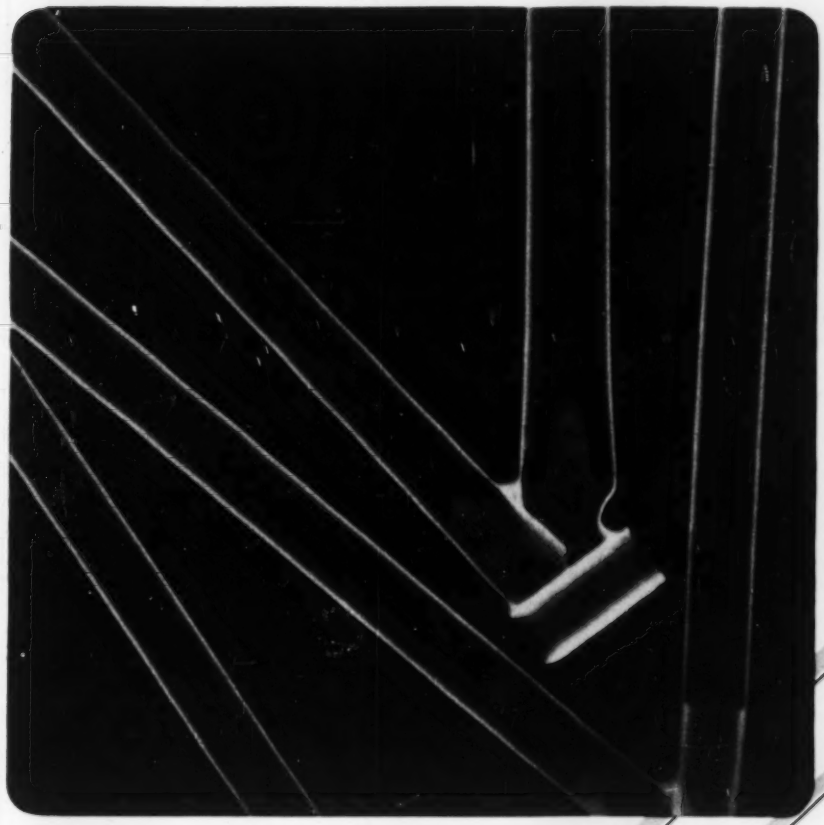
Describes Thermodynamics

THERMODYNAMICS OF ALLOYS, by John Lumsden; cloth, 384 pages, 5½ x 6½ inches; published by Institute of Metals, London, England, for $5.50.

This book deals with thermodynamics as a means of correlating, codifying and cross-checking diverse physico-chemical measurements on metals and alloys. Primarily, emphasis is laid on the usefulness of thermodynamics for the accurate correlation of various equilibrium properties. With this end in view, the theory is developed from first principles, with the mathematics kept as simple as possible, but care is taken to avoid misleading oversimplification on such matters as the statistical interpretation of entropy. Illustrative calculations on actual metals and alloys are worked out in detail. The interpretation of thermodynamic parameters in terms of statistical mechanics is also discussed.

Many diagrams are included to stress various points. Name and subject indexes conclude the book.

Radiography checks—



then double checks

LANDING GEAR STRUTS lead a life of punishment. Though light, they must be strong. Their joints must be sound. Radiography is the method used to prove them sound.

A maker of amphibian aircraft goes even further. Though treated and sealed, strut members can develop internal corrosion and become weakened. Radiography alone can provide the required nondestructive examination of these internal surfaces. So it has become routine to x-ray these struts as part of the periodic inspection of the planes.

This is but one example of how radiography is proving a boon to the welding process. It is helping to open new fields for the use of welding—especially in the fabrication of highly stressed products and assemblies.

Look into the ways Radiography can aid your business. Your x-ray dealer will be glad to give you full information and assistance.

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography—

another important function of photography

Kodak
TRADE-MARK

Finishing Show Opens June 19

More than 100 new industrial finishing services and products are expected for display when the 1952 Industrial Finishing Exposition opens June 19 at the International Amphitheatre, Chicago. This exposition is the third since World War II.

It holds new appeal this year because manufacturers of paints, lacquers, enamels, ovens, spray painting equipment and temperature controls have been invited to exhibit for the first time. Previously the show was limited to base metals and chemicals, plating and polishing equipment.

Sponsor, American Electroplaters Society, plans technical sessions to be held at the Stockyard Inn simultaneous with the exposition.

Series of educational exhibits, announced by trade groups, will show important operational phases in the finishing field. Chicago custom plating firms will show various types of plating on metal objects, plus contrasting operations found in normal plating room practices. A second feature will be automatic handling of decorative coating, shown in a complete plating room line.

The society's research committee will feature an exhibit showing technical projects the society is studying in American universities and industrial plants. Committee members will be present to explain methods and procedures employed.

Ceramic Activities Joined

After two years of co-ordinated production and testing of ceramic coated parts for high-temperature aircraft applications, Ryan Aeronautical Co. and California Metal Enameling Co. announce they are combining activities in this field.

The two firms also disclosed an improved ceramic, A-418-Ryanco-C, developed through laboratory and service tests, and already used in production of aircraft engine components. This process involves improved A-418 ceramic materials, plus new methods and thicknesses of application.

These companies have carried out a development program since early 1950 to verify benefits of special coatings when used with high temperature components for aircraft power plants.

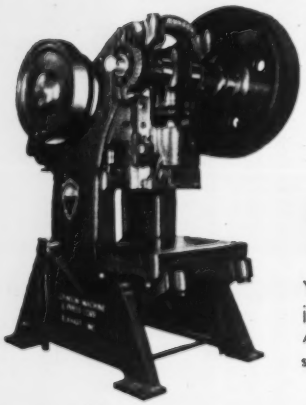
Agreement provides that the companies will work jointly on a continuing research program for improvement of high temperature ceramic coatings and methods of application. Latest product is designed to perform under continuous temperature of 1800° F. It remains unaffected by thermal shocks encountered in exhaust systems between minus 70° and 1700° F.

Fuels Institute Meets May 13

Institute on industrial fuels combustion, planned by University of Wisconsin, will be held in Madison May 13-15 in co-operation with fuels consultants and equipment manufacturers. Arranged for power and heating engineers, it will consider problems involved in efficient coal, oil and gas burning.

Program sessions will consider

JOHNSON Bonus Built POWER PRESSES



15 MODELS
CAPACITIES OF
16 to 90 Tons

RUGGED DEPENDABLE TIME-TESTED

You can handle larger jobs on smaller presses. Ask about the extra safety features.

Write for Bulletin 52 . . . a complete description of all Johnson's 14 models. Request data sheet on the Hydra-Shear.

NEW... DIFFERENT... AND BETTER for real production shearing

the HYDRA-SHEAR
to handle up to 10 gauge in 6' - 8' - 10' lengths. No gears or clutch . . . Overload hazards eliminated . . . Lessens curl and burring.

Johnson Machine and Press Corp.
620 W. INDIANA AVE. ELKHART, INDIANA

When there's a smarter way to do it... Great Northern will have it!

Where would *you* go for ideas if you wanted to find the finest modern system for heavy materials handling? You couldn't make a better choice than the Great Northern Railway.

Along its 8,314-mile route, Great Northern handles enormous tonnages of ballast, timber, ties, steel and everything it takes to make a railroad go. The efficiency of this work is admired far and wide. And one reason is *modernization*, including use of American Locomotive Cranes.

The principle of the crane-on-rails is an old one; but today's American DiesELectric, for instance, is as different from old steam cranes as night is from day. In power, speed, flexibility and economy, these splendid new Americans are like entirely new machines. *One man* is all the crew needed. "Down" time has been virtually eliminated. Upkeep expense has been cut to astonishing lows.

In planning for modernization, then, put your money on the locomotive crane. And to be sure of long-lived dependability . . . lowest cost per ton of load moved . . . look to the name AMERICAN. These cranes are built in Diesel and DiesELectric types, capacities from 25 to 80 tons.

2602

19

Modernize...economize...with

American Hoist
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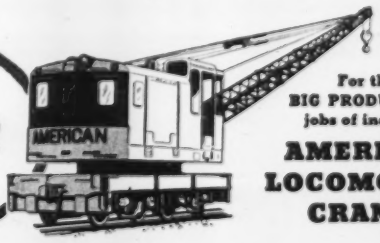
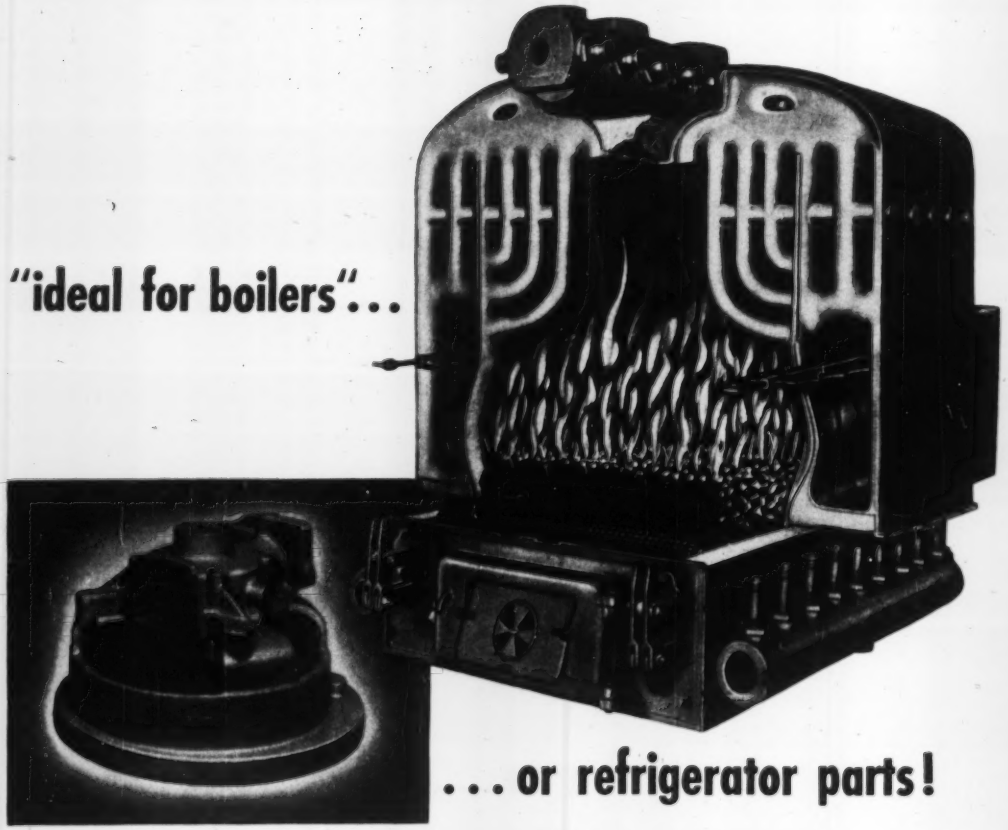


For the BIG PRODUCTION jobs of industry...

AMERICAN LOCOMOTIVE CRANES

"ideal for boilers"...



...or refrigerator parts!

take advantage of the versatility of GRAY IRON!

"GRAY IRON IS IDEAL FOR BOILER CONSTRUCTION", says the manufacturer of this boiler, "because it resists to the greatest possible extent the numerous corrosive factors that attack boilers both internally and externally. Furthermore, many boilers receive indifferent or poor care. Consequently, a very durable material is necessary for their construction."

WHERE RESISTANCE TO HEAT, CORROSION, WEAR AND VIBRATION is required—for boilers or refrigerator parts—gray iron provides it, at an economical cost. For example, this manufacturer reports gray iron boilers that are still in service after 67 years, without major repairs.

SO CONSIDER GRAY IRON whenever you need a part that must be durable under adverse operating conditions—that's either plain or intricately shaped—gray iron provides a wide strength range, is easily castable and readily machinable. You'll find all these advantages in gray iron castings.

Make it Better with Gray Iron

Second largest industry in the metal-working field

SCRAP IS NEEDED FOR DEFENSE—KEEP IT MOVING!

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Known as UNIT CRANE DESIGN, this unique method of crane construction gives you far greater operating efficiency. Then too, your maintenance costs are reduced because any one unit can be removed for overhauling or repair without dismantling any other unit.

See your nearest distributor for more information on how READING UNIT CRANE DESIGN can give you better materials handling at less cost. And for your free copy of "The Why and How of Faster Production", drop us a line, today.

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conversion of solid fuel installations to burning natural gas. Dual and multiple fuel-burning arrangements will be described. Other phases to be discussed are fuel characteristics, economical selection and application of fuels, combustion analysis and control, and the utilization of waste and by-product fuels.

D. J. Barrington, of the university's extension division will serve as co-ordinator.

Sigma Welding Covered

Two booklets, covering sigma welding of carbon steels and flame hardening, are offered by Linde Air Products Co., division of Union Carbide & Carbon Corp., New York.

In the former, advantages of argon-oxygen mixtures in shielded inert gas metal arc welding of carbon steels are analyzed. The 12-page study includes effect of gas flow, current density and welding speed on porosity, and effect of voltage on penetration when using a 5 per cent oxygen mixture. Rod burnoff and metal deposition rates for sigma and flux-coated electrode welding are also compared.

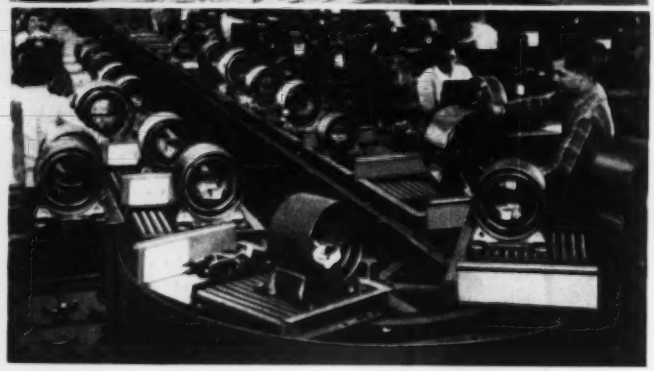
Latter publication describes the flame-hardening method of surface treatment. It cites advantages and lists steel that can be hardened. Several types of applications are illustrated to show wide variations possible from the process.

Both booklets are available free from the division, 30 E. 42nd St., New York 17.

Carbide Grades Charted

Adamas Carbide Corp. offers its revised "Carbide Manufacturer's Grade Recommendations." Chart was prepared as a result of a survey made by the carbide industry standardization committee. Manufacturers were asked to recommend the grade or grades of their product best suited for specific applications. Proper grades are indicated for chip removal on steel and nonferrous materials for roughing cuts through precision boring. Wear and impact applications are also covered.

A feature is adoption of symbols C-1 through C-14 to indicate each specific application. Company says adoption of this symbol code will prove desirable since it should



Standard Conveyors can speed operations

Keeping things moving — avoiding "bottle-necks" — on production, assembly, processing or packaging lines can be done better, faster, and cheaper *mechanically* with conveyors.

Your needs in conveyors — ranging from power and gravity conveyors, roller, belt, slat, chain, push-bar, sectional — to portable, self-contained conveyors — spiral chutes — pneumatic tube systems — can be met at Standard, with a conveyor experience record of more than 45 years. Write — Address Dept. ST-42.

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General Offices: North St. Paul, Minnesota
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Write Dept. ST42 for Standard's General Catalog and tell us what you want to convey.

ROLLER • BELT • SLAT • CHAIN • WHEEL
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simplify inventory and purchasing problems and insure proper application of carbide. Copies of chart CC can be obtained free upon request to the company, Box 149, Harrison, N. J.

Shot Peening Study Published

Squeeze on production forced by tight materials supplies makes conservation a top engineering aim. Shot peening offers one way of stretching hard-to-get supplies, i.e., it makes them stronger. Theoretical and practical fundamentals on this process are spelled out in the "Shot Peening Manual," published recently by Society of Automotive Engineers.

Manual covers shot peening for designer, process engineer and production man. It ranges in definition from what shot peening is and does to machines and materials used. It details current practices in peening various parts.

Shot peening can be used in two ways to better fatigue properties of a part, states the SAE manual. It can increase stress for a given life, or increase life at a given repetitive stress. These gains vary from 50 to 100 per cent, depending on material used.

Described in detail are various type air blast and centrifugal machines used for propelling the shot. Publication shows some of the work-handling devices used to insure uniform treatment over the surface of complex-shaped parts. Methods for controlling shot intensity and coverage are outlined with discussions of equipment and procedures employed.

Copies are available from the society, Special Publications Dept., 29 W. 39th St., New York 18. Price for members is $1.50; for nonmembers, $3.00.

Unit Heater Care Discussed

"Care and Maintenance of Steam and Unit Hot Water Heaters" is a four-page publication covering proper procedure for getting the most out of heating units. Diagrams supplement text material to give proper instruction on points sometimes omitted in installing vacuum, low pressure gravity and high pressure systems, branches from steam supply main, strainers

PHOENIX METAL ROLLS are color marked for specific uses in rolling . . .

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AND FINISHING

TIE PLATE
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PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION of BLAW-KNOX COMPANY • PITTSBURGH, PA.

P.R.W.

and new heaters. Discussing maintenance, the bulletin covers motors, heating elements, fans, castings and reviews corrosion as it affects the units. Copies are available free from Industrial Heating Association, 2159 Guardian Bldg., Detroit 26.

ASTM Works for Conservation

American Society for Testing Materials has been requested to develop methods of conserving scarce materials through the use of substitutes or more efficient use. These services will be rendered under contract to the recently appointed consultant to the director of defense mobilization on conservation of materials, John R. Townsend of Bell Telephone Laboratories. Individual projects will be undertaken at request of the consultant and reports will be furnished to him.

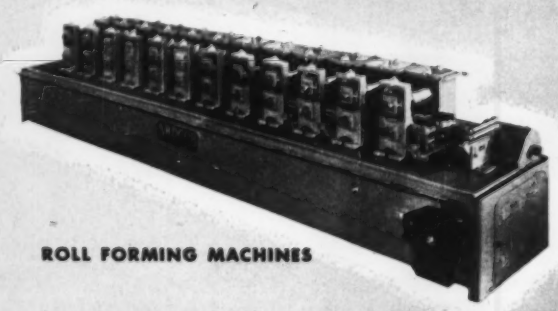
To carry out this work, the society is employing a staff engineer, Howard S. Phelps, who recently retired as engineer in charge, Testing Division, Engineering Department, Philadelphia Electric Co. Mr. Phelps will be available to the ODM consultant for assignment of problems, assembling information and similar activities relating to the project. ASTM's executive secretary, C. L. Warwick, will have general administrative supervision for the society.

Among the services to be performed under this contract are collection and organization of facts and reliable opinion dealing with materials conservation by using extensive facilities available to the society, notably through its technical committees. Development of emergency and substitute ASTM tests and specifications will also further the conservation effort. The society will also use its facilities to inform its members concerning needs for conserving critical materials and various ways in which such conservation can be accomplished.

First results of the society's conservation efforts were published (STEEL, Apr. 21, p. 113) following recent meeting of Committee A-1 on Steel in Philadelphia.

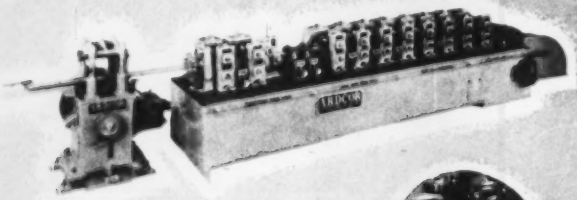
ARDCOR *Engineered*

MEANS BETTER COLD-ROLL FORMING



ROLL FORMING MACHINES

PUNCH TYPE CUT-OFFS LOCK SEAM TUBE MILLS



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Quality Control: A Process Tool

Common interpretation of the term, "quality control," holds it is a fancy or dressed-up inspection system. Wade Weaver, president of American Society for Quality Control, said at the spring technical meeting of Pressed Metal Institute, "Quality control is an inspection tool, and it will help on inspection, if inspection is your problem, but it is by no means confined to inspection problems. . . . The greatest part of the field is in other areas."

Henry J. Jacobson, chairman of the committee on quality control, PMI, moderator of the panel, says, ". . .quality control sticks its nose in everywhere." He also emphasizes the fact that a system cannot be put in a plant and the benefits realized immediately. It may require a year or more of apparently unrewarding work before it begins to pay off.

Mr. Weaver says the system can take the personal bias out of research. In management decisions it shows that experience and good old common sense can be wrong. Probably the greatest field for the

Salt does things for Steel, too

There's nothing like a salt bath to bring out the best qualities when heat treating steel . . . to make sure you get the full physical properties metallurgists put in the metal at the start.

But using the *right* salt is essential for precision heat treating. Many a metalworking plant like yours is getting accurate control of temperature . . . within 5° F. either way . . . by specifying the Houghton salt bath developed for the job.

And they're getting such accuracy *fast*. The heat transfer rate in molten salt is much more rapid than when atmosphere furnaces are used.

Why not take advantage of Houghton's 85 years of experience —to improve your own heat treating operations? The knowledge gained by working closely with heat treaters over the years will be willingly shared with you. And our research files are always available when you ask the Houghton Man for help.

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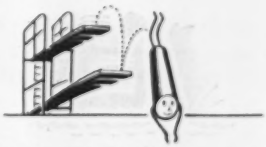
Case Hardening Problems Are Rare among users of Houghton "Perliton" . . . the liquid salt bath carburizer with a "blanket" of carbon over the bath surface which prevents surface oxidation. If you want faster carburization and more uniform parts, try "Perliton."

Neutral Salt Bath Works Wonders in uniform heating for hardening. No tendency to decarburize when Houghton "Liquid Heat" is correctly used. This efficient salt effectively controls damaging "atmosphere" around the work—by simply eliminating all atmosphere. No scaling. No oxidation. Parts stay clean.

High Speed Steel quenched at high temperature ranges calls for Houghton liquid salt baths developed for the precision heat treatment required. It will pay you to consult the Houghton Man for the product that best fits your specific applications.



For Interrupted Quenching . . . eliminating quench cracks, distortion and dimensional changes use Houghton Mar-Temp Salt. Its low melting point gives you the extreme fluidity at low quenching temperatures (400°-600° F.) needed for good results.

Houghton Pioneering in metalworking and processing fields has resulted in a vast amount of helpful production data. Whatever your heat treating problems, ask the Houghton Man or write to E. F. Houghton & Co., Philadelphia 33, Pa.

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For over a year, Arcos Low Hydrogen Electrodes have been successfully producing sound welds on armor that meet the most critical specifications. This practical application has proved how quantities of scarce nickel and chromium can now be saved to meet other urgent defense requirements.

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use of quality control is in process and product planning. This includes raw materials, machinery, manpower, tool design, inventories, etc.

Dipping Basket Types Shown

Dipping baskets for immersing objects in electrocleaning and electroplating solutions are the subject of a bulletin published by Hanson-Van Winkle-Munning Co. Publication covers 12 standard wire baskets and includes three tables giving dimensions of 27 round, seven tray and 22 rectangular models.

Concluding section concerns special baskets: Sheet metal, rubber-covered and scrap-anode. Chart indicates when to use steel, brass, aluminum, nickel-chromium, stainless or rubber-covered types for bright, cyanide and acid dips, alkali cleaners and etching. Bulletin D-108 is available free from the company, Matawan, N. J.

Truck Dock Bows to Fork Lift

Materials handling case study released by Baker-Raulang Co. shows how United Stove Co., Ypsilanti, Mich., saved the cost of a new loading dock by using a fork truck with a revolving head attachment for shipping work. United's plant floor, shipping and receiving areas and shop yard are all on the same level. Getting loads in and out of highway trucks quickly and economically was a handling problem that apparently could be solved only by constructing a new shiping dock.

As an alternative, United used a 6000-pound capacity fork truck for all shipping area work. Revolving head attachment loads scrap output into highway trucks. Firm estimates savings reach 75 per cent on loading and unloading jobs, about as much on scrap handling. Illustrated copies of this study will be sent by the truck manufacturer, 1230 W. 80th St., Cleveland 2.

Stamper Reviews Parts Range

Detroit Stamping Co.'s range of production equipment for high-volume precision stamping is reviewed in a six-page brochure published by the company. Included are notes on advantages, limitations and spe-

cialties, plus a listing of sales representatives. Illustrations show stampings and plant equipment with data pertinent for designers and buyers of stamped metal parts. Brochure is available from the stamper, 359 Midland Ave., Detroit 3.

MIT Plans Electronics Courses

Three electrical engineering fields will be reviewed in special summer courses offered by Massachusetts Institute of Technology. Instruction is planned to cover feedback control systems, digital computors and dielectric materials.

Course in feedback control, offered June 9-20, includes material on signal flow diagrams, degree of stability and criteria of adjustment for obtaining specific transient and frequency response patterns. Linear theory will be extended to include the contactors, step-by-step, sampling data and pulse control mechanisms.

Program in digital computors, offered July 21-Aug. 1, emphasizes techniques for preparing coded problems. Course reviews applications of computors to scientific and engineering calculations, accounting and logistics problems and military control and strategic work.

Special course on dielectric materials is scheduled Sept. 3-12. It covers major topics of macroscopic and molecular properties, measuring techniques, materials and their applications.

Requests for information concerning admission to the summer sessions should go to Dr. Ernest H. Huntress, Room 3-107, MIT, Cambridge 39, Mass.

New Plumbing Standard Printed

Third edition of Commercial Standard for Enameled Cast Iron Plumbing Fixtures, CS77-51, is available as a printed booklet. This edition enlarges the previous standard by the addition of illustrations showing size dimensions, and details such as supply and outlet dimensions and heights of backs. Some minor revisions of standard sizes, tolerances and definitions are also included, but principal provisions of the previous edition are continued unchanged.

Booklet also gives a brief history of this standardization proj-

ARCOS Stainless Electrodes pass rigid quality control tests before you receive them

Every time you weld with Stainless Electrodes, you want to be sure that the weld metal produced will be consistently of the highest quality—physically, chemically and metallurgically. Getting results like these can be guaranteed only through constant testing and retesting of every batch of electrodes manufactured. Arcos control specifications are the most rigid in the industry, and that's why every Arcos Stainless Electrode you use will deliver improved welding performance at lower welding costs.

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ect, and a list of acceptors, including names of manufacturers, distributors, purchasers and testing laboratories that plan to use the standard. Printed copies may be obtained from Superintendent of Documents, Government Printing Office, Washington 25, for 15 cents a copy.

ISO Poses Bearing Standards

World-wide system of standards for ball and roller bearings will be discussed by international standardization experts from eleven countries meeting in New York June 16 to 26. Meetings will be held at Columbia university in conjunction with the second triennial general assembly of the 33-nation International Organization for Standardization (ISO).

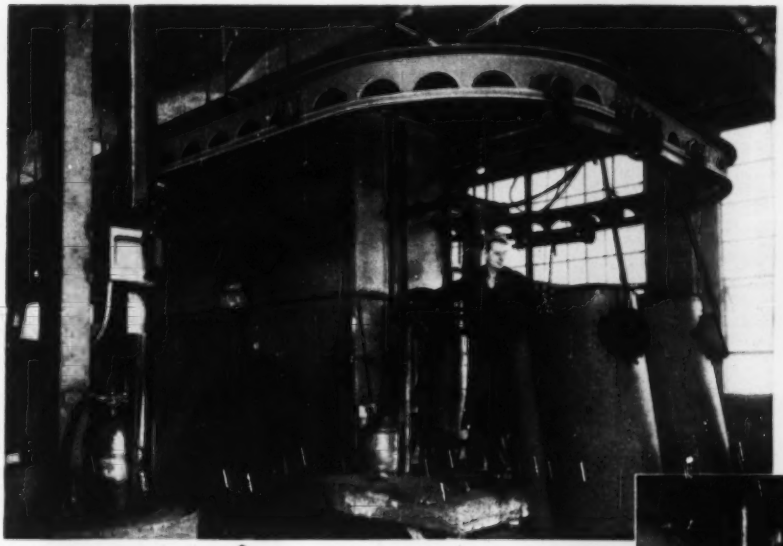
Two technical subcommittees on radial bearings and taper roller bearings will also meet. The ISO project seeks to standardize terminology and definitions of bearings and bearing parts; nominal dimensions and tolerances of ball and roller bearings affecting their assembly with other machine parts; methods of inspection; methods of evaluating load ratings; and dimensions of mounting accessories.

One item on the agenda is the U. S. proposal, circulated among ISO members last June, for standardized taper roller bearings in inch dimensions. Taper roller bearings were developed in the United States and their dimensions have been, from the beginning, expressed in inch rather than in metric units.

The Swiss have requested consideration of their standards for a series of new miniature ball bearings for use in clocks.

Battery Maintenance Charted

Gould-National Batteries Inc. offers a check-chart designed to improve maintenance of motive power batteries. Chart tabulates procedures to follow in five basic maintenance operations and shows frequency of each. It standardizes battery care and helps train new maintenance men. Rules are established for charging, adding water, cleaning, safe handling and accurate records. To obtain charts, write to the company, Trenton 7, N. J.



One man transfers furnace bodies, weighing 200 lbs., coming from welding booths to Tramrail track by means of a lift platform. Usually when he advances one carrier to spray booth, all 16 carriers must be moved at same time.

The curved track section is necessary to bring the furnace bodies near the water screen during spray painting so that paint in atmosphere will be removed properly. All points of a body are easily reached when supported overhead and the work is extremely fast.

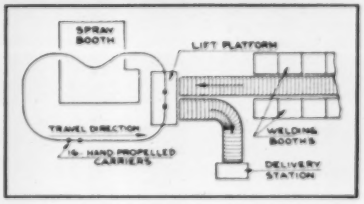
Easy Push Moves 16 Carriers on Spray Booth Loop

CAN one man push 16 loaded four-wheel carriers (with 64 wheels in all) around an enclosed Tramrail track loop having six left-hand and two right-hand curves?

That question bothered the Armstrong Furnace Co., Columbus, Ohio (subsidiary of Lennox Furnace Co., world's largest furnace manufacturers) when they were developing their paint-spray systems for painting furnace bodies. There was considerable fear that friction and binding of so many carriers would create too great a load for one man to push hundreds of times during a normal working day.

They now have two such systems in operation. One man easily moves the carriers even when all are loaded. Little effort is required because of ball-bearing wheels and hard smooth flat treads on both wheels and track and easy swiveling yokes.

The systems are extremely efficient, requiring only two men each. 300 furnace bodies can be painted with each, in an eight-hour period.



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CALENDAR
OF MEETINGS

April 27-May 1, American Ceramic Society: Annual meeting, William Penn Hotel, Pittsburgh. Society address: 2525 N. High St., Columbus, O. Secretary: Charles S. Peaffe.

April 28-29, Association of Iron & Steel Engineers: Spring conference, Netherland Plaza Hotel, Cincinnati. Association address: 1010 Empire Bldg., Pittsburgh 22. Managing director: T. V. Ess.

April 28-30, Chamber of Commerce of the U. S.: Annual meeting, Chamber of Commerce Bldg., 1615 H St. NW, Washington 6. Executive vice president: Arch N. Booth.

April 28-May 3, Concrete Reinforcing Steel Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Ihlefeld.

April 29-30, Metal Powder Association: Annual meeting and metal powder show, Hotel Drake, Chicago. Association address: 420 Lexington Ave., New York 17. Acting secretary: Robert L. Zeigfeld.

April 30-May 4, Industrial Diamond Association of America Inc.: Annual meeting, Princess Hotel, Bermuda. Association address: 124 E. 40th St., New York. Secretary: Athos D. Leveridge.

May 1-7, American Foundrymen's Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society address: 616 S. Michigan Ave., Chicago. Secretary: W. W. Maloney.

May 1-7, Annual International Foundry Congress & Exposition: Convention Hall, Atlantic City, N. J. Host: American Foundrymen's Society.

May 2-3, Industrial Fasteners Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 3648 Euclid Ave., Cleveland. Secretary: James D. Eggers.

May 4-8, Electrochemical Society Inc.: Semi-annual meeting, Benjamin Franklin Hotel, Philadelphia. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

May 5-6, Stanford Research Institute: National air pollution symposium, Huntington Hotel, Pasadena, Calif. Institute address: 612 S. Flower St., Los Angeles 14. Chairman: Dr. A. M. Zarem.

May 5-7, Automotive Engine Rebuilders Association: Spring meeting, Hotel Plaza, San Antonio, Tex. Association address: 419 N. Capitol Ave., Indianapolis. Executive vice president: R. G. Patterson.

May 5-7, American Mining Congress: Annual spring meeting, Netherland Plaza Hotel, Cincinnati. Congress address: 1102 Ring Bldg., Washington 6. Secretary: Julian D. Conover.

May 6-8, National Highway Users' Conference: Highway transportation congress, Washington. Conference address: National Press Bldg., Washington 4. Director: Arthur C. Butler.

May 6-9, Scientific Apparatus Makers Association of America: Annual meeting, Edgewater Beach Hotel, Chicago. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

May 7-9, Industrial Waste Conference: Purdue Memorial Union, Purdue University, E. Lafayette, Ind. Secretary: Prof. Don E. Bloodgood, Sanitary Engineering Dept.

May 7-10, National Screw Machine Products Association: Annual spring meeting, Hotel Chase, St. Louis. Association address: 2860 E. 130th St., Cleveland. Executive secretary: Orrin B. Wernts.

May 8-9, The Wire Association: Spring meeting, William Penn Hotel, Pittsburgh. Association address: 1453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

May 8-9, National Association of Sheet Metal Distributors: Spring meeting, William Penn Hotel, Pittsburgh. Association address: 1900 Arch St., Philadelphia 3. Executive secretary: Thomas A. Fernley Jr.

May 8-9, American Institute of Mining & Metallurgical Engineers: Northwest metals and minerals conference, Davenport Hotel, Spokane, Washington. Publicity director: W. S. Patterson, Kaiser Aluminum & Chemical Corp., Spokane 10.

May 11-14, American Institute of Chemical Engineers: Annual spring meeting, French Lick Springs Hotel, French Lick, Ind. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

May 11-14, Industrial Furnace Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: V. P. Gopcevic.

May 12-14, Liquefied Petroleum Gas Association Inc.: Annual meeting and exhibit, Palmer House, Chicago. Association address: 11 S. LaSalle St., Chicago 3. Secretary: Arthur C. Kreutzer.

May 14-15, National Industrial Conference Board: Spring conference, Waldorf-Astoria Hotel, New York. Address: 247 Park Ave., New York 17. Assistant director, conference division: (Mrs.) I. E. Brown.

May 14-16, American Leather Belting Association: Spring meeting, Skytop Lodge, Skytop, Pa. Association address: 320 Broadway, New York 7. Secretary: E. R. Rath.

May 14-16, Society for Experimental Stress Analysis: Spring meeting, Hotel Lincoln, Indianapolis. Society address: Box 168, Cambridge, Mass.

May 18-21, Copper & Brass Research Association: Annual meeting and exhibit, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: Bertram B. Caddle.

May 19, Rail Steel Bar Association: Annual meeting, General Brock Hotel, Niagara Falls, Ont. Association address: 38 S. Dearborn St., Chicago 3. Secretary: W. H. Jacobs.

May 19-20, American Steel Warehouse Association Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 442 Terminal Tower, Cleveland 13. President: Walter S. Doxsey.

(Continued on p. 128)

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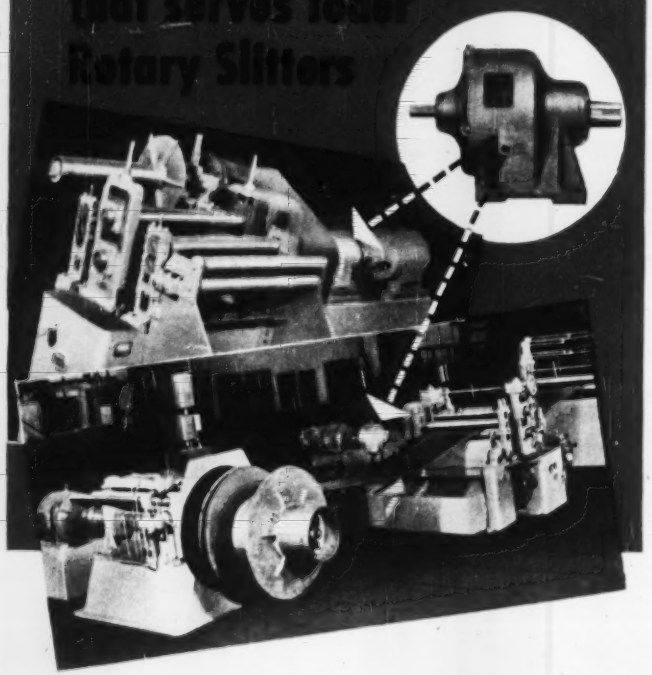

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(Concluded from p. 126)

May 19-21, National Industrial Distributors Association: Annual meeting, Atlantic City, N. J. Association address: 1900 Arch St., Philadelphia 3. Secretary: H. R. Rinehard.

May 19-21, American Supply & Machinery Manufacturers Association: Annual convention and conference booth activity, Hotel Traymore, Atlantic City, N. J. Association address: 731-732 DuPont Circle Bldg., Washington. General manager: R. Kennedy Hansen.

May 20-21, Nuclear Energy Conference: Michigan State College, E. Lansing, Mich. Program chairman: D. J. Renwick, Mechanical Engineering Dept.

May 21-22, American Iron & Steel Institute: Annual meeting, Waldorf - Astoria Hotel, New York. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

May 21-23, Gas Appliance Manufacturers Association: Spring meeting, The Broadmoor, Colorado Springs, Colo. Association address: 60 E. 42nd St., New York. Secretary: H. Leigh Whitelaw.

May 22-23, American Coal Sales Association: Annual convention, The Homestead, Hot Springs, Va. Association address: 1625 Eye St., Washington 6.

May 22-24, American Society for Quality Control: Annual meeting & exhibit, War Memorial Auditorium, Syracuse, N. Y. Society address: 70 E. 45th St., New York 17. Secretary: Alfred L. Davis.

May 25-28, National Association of Purchasing Agents: Annual international convention & exposition, Convention Hall, Atlantic City, N. J. Association address: 11 Park Place, New York 7. Executive secretary: George Renard.

June 1-6, Society of Automotive Engineers: Summer meeting, Ambassador & Ritz-Carlton Hotels, Atlantic City, N. J. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

June 2-3, Multiple V-Belt Drive & Mechanical Power Transmission Association: Spring meeting, Edgewater Beach Hotel, Chicago. Association address: 7 W. Madison St., Chicago 2. Secretary: Harry P. Dolan.

June 2-4, American Gear Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

June 2-13, Canadian International Trade Fair, Exhibition Grounds, Toronto.

June 5-7, Electric Metal Makers Guild Inc.: Annual meeting, French Lick Springs Hotel, French Lick, Ind. Guild address: Box 6026, Mt. Washington Station, Pittsburgh. Secretary: C. B. Williams.

June 9-21, International Organization for Standardization: Triennial meeting, Columbia University, New York. Secretary-general: Henri St. Leger, Geneva, Switzerland. Host association: American Standards Association, 70 E. 45th St., New York 17. Secretary: George F. Hussey Jr.

June 13, The Wire Association: Regional meeting, Hotel Biltmore, Los Angeles. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

June 15-18, National Association of Cost Accountants: Annual international cost conference, Waldorf-Astoria Hotel, New York. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

June 15-19, American Society of Mechanical Engineers: Semi-annual meeting, Sheraton-Gibson Hotel, Cincinnati. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

June 16-18, Malleable Founders Society: Annual meeting, The Homestead, Hot Springs, Va. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

June 16-20, American Electroplaters Society: Annual meeting and industrial finishing exposition, Hotel Conrad Hilton and International Amphitheatre, Chicago. Society address: Box 168, Jenkintown, Pa. Secretary: D. Gardner Foulke.

June 22-24, Alloy Casting Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 32 Third Ave., Mineola, N. Y. Secretary: E. A. Schoefer.

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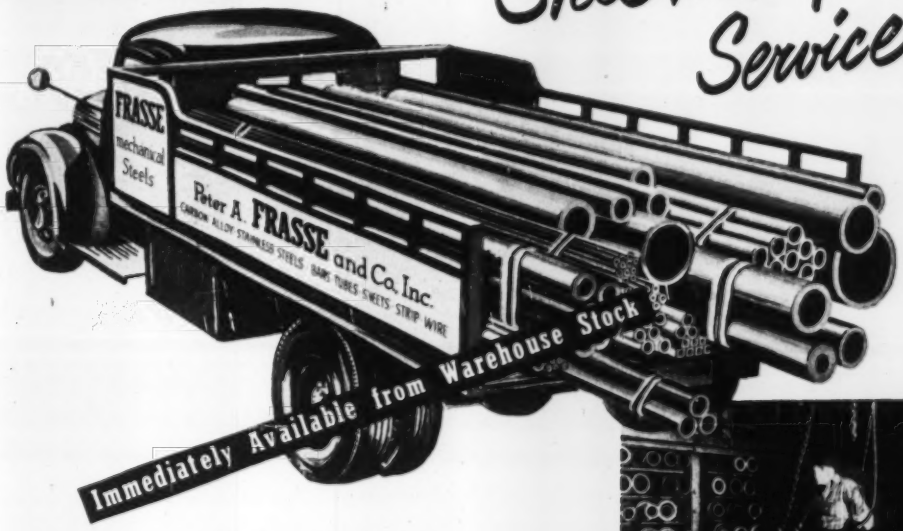

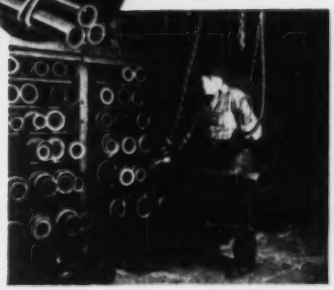

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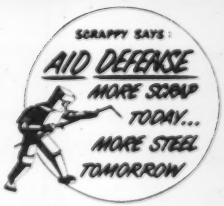

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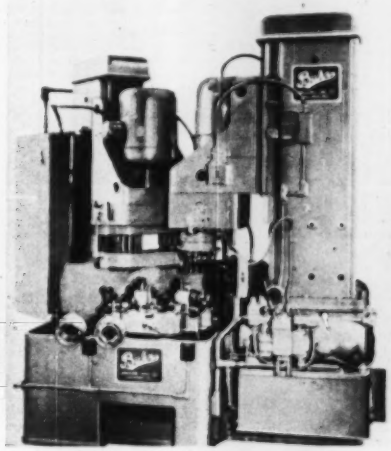
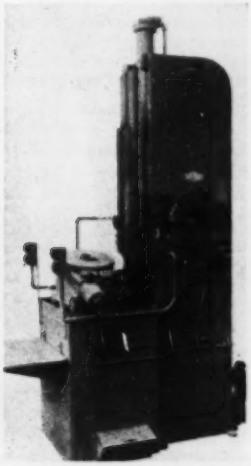


SPECIAL MACHINE SPEEDS TANK PART WORK
. . . drills, taps both sides of piece in same fixture



SURFACE BROACHING
. . . a vertical 15-ton tool

Forging Press Line Improved

USE REPLY CARD—CIRCLE No. 1

Improved line of high speed forging presses, in 300 to 400-ton capacities, is announced by E. W. Bliss Co., Canton, O. Press line features heavy duty air friction clutch and air release spring-set brake, both mounted on a full eccentric main shaft. Welded steel frame's main stress members are located immediately adjacent to either side of die seat and extend from bottom of the bed to top of the crown. These members have heavy sections to keep elongation of frame to a minimum when load is applied. A heavy plate, integral with the two front gibs opposes inward deflection of frame toward slide ways. Front of the slide has long continuous gib ways extending up into crown to keep dies in alignment.

Regular equipment includes a cam knockout in the slide and a cam liftout in the bed. Die seat is a self-contained unit, equipped with an easily operated wedge adjusting mechanism. Buffer cylinder, installed in the crown, assists the brake in stopping the heavy slide at top stroke and furnishes additional accelerating force when starting the slide.

Tool Processes Tank Parts

USE REPLY CARD—CIRCLE No. 2

Special drilling and tapping machine, made for processing tank parts, is announced by Buhr Machine Tool Co., Ann Arbor, Mich. Designed for high flexibility, company says it can be converted easily to other uses when demand ceases for the present application. Unit drills and taps both sides of the part in the same fixture by turning part over after one side has been worked.

Two sets of locators are used, a single lever actuating both sets—lowering one set as it raises the other into working position. The two-column combination machine has a 24-spindle drill head, a 12-spindle individual lead screw tapping head and one four-station fixture, mounted on an index table.

REPLY CARDS

on page 141 will bring you more information on any new products and equipment in this section.

Surface Broaching Machine

USE REPLY CARD—CIRCLE No. 3

American Broach & Machine Co., Ann Arbor, Mich., offers its 72-inch stroke, 15-ton vertical hydraulic surface broaching machine. Tool is equipped with fixed hydraulic cylinders to operate work slide that is guided in adjustable hardened and ground ways. These ways, with larger cross-section are designed to provide increased accuracy in machine slide.

Designated SB-72-15, the broaching machine is offered with receding work table and automatic indexing unit to broach 95 "Christmas tree" form slots in turbine wheels. Models are also available with 90 and 120-inch stroke, and all conform to J.I.C. standards.

Truck Carts Welding Equipment

USE REPLY CARD—CIRCLE No. 4

Welder's truck made for industrial users of acetylene equipment is offered by Palmer-Shile Co., 16025 Fullerton, Detroit 27, Mich. Accommodating one gas and one air cylinder, truck cradles each cylinder in individual holder to prevent rolling or turning when unit is moved.

Tool box for torches, tips and other equipment is located between

handles for instant use. Model is swivel type, and handles have cross bar on which torch hanger can be mounted. Framework is made of angle iron and sheet metal, all-welded construction. Height is 48 inches; width, 29 inches.

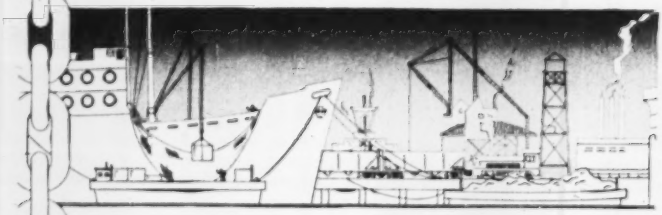
Multi-Use Belt Conveyor

USE REPLY CARD—CIRCLE No. 5

Belt conveyor designed for flexibility in all phases of construction is offered by Flexoid Conveyor Co., division of Smith Power Transmission Co., 1543 E. 23rd St., Cleveland 14, O. Conveyor has a standard 12-inch belt width, but can take belts to a variety of lengths or widths. Variable speed drive powers the unit at a standard rate of 20 fpm; maximum 40 fpm is possible.

Belt can be white neoprene, stitched or woven canvas or rubber depending on its use. Motor size depends on length of belt and material being handled. Table constructed on each side of traveling belt is 15 inches wide, made of maple, masonite or metal. Adjustable legs give table height flexibility in accordance with individual requirements.

What's New



in New Jersey

New Deepwater Facilities Help Industry in New Jersey

There are many *new* developments in New Jersey today . . . and among the important advantages offered to industry are the plans to improve deepwater shipping facilities in the state known as the Crossroads of the East.

New Jersey is famed for the outstanding shipping and docking facilities available to industry at the Port of New York, Port Newark and the Port of Camden.

Now, *new* construction of docking and loading improvements are planned for shippers on the Jersey side of the Hudson River. And along the Delaware River, a project is outlined to provide a 40 foot channel from Camden to the Trenton area to facilitate deepwater shipping to and from the *new* U. S. Steel plant and other industries.

There is a lot more *news* about New Jersey—*new* research plants, *new* highways, *new* markets, *new* opportunities for plant sites—which is of particular interest to industry. Do you want to know what's *new* in New Jersey?

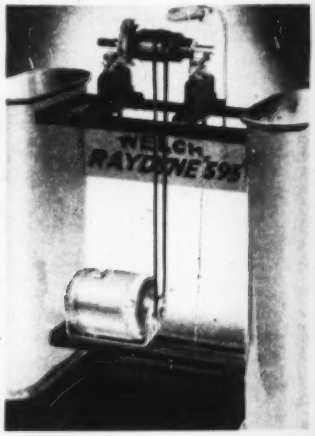
Write Box F, Public Service Electric and Gas Company, 70 Park Place, Newark, N. J. for the new brochure, "An Industrialist's View of the Crossroads of the East."

PUBLIC SERVICE

Balancing Line Expanded

USE REPLY CARD—CIRCLE No. 6

Addition of the Raydyne 595 to its line of dynamic balancing machines is announced by Welch Mfg. Co., 920 W. Laurel St., Springfield, Ill. Simplified shop method of indicating unbalance in rotating parts weighing a maximum 100 pounds is attributed to the machine. This is done without necessity for making specially-fitted bearings, adapters or universals. These are eliminated by v-type bearings, employed to insure accurate bearing fit over a wide diameter range. Point on the work needing weight correction is indicated by an instant flashing stroboscope. Unit is a floor model designed expressly for repair shops having a wide variety of balancing work. Operating speed can be varied by changing pulley size on the motor or by ordering the machine equipped with variable speed motor as optional equipment.



. . . simplified indicating of unbalance

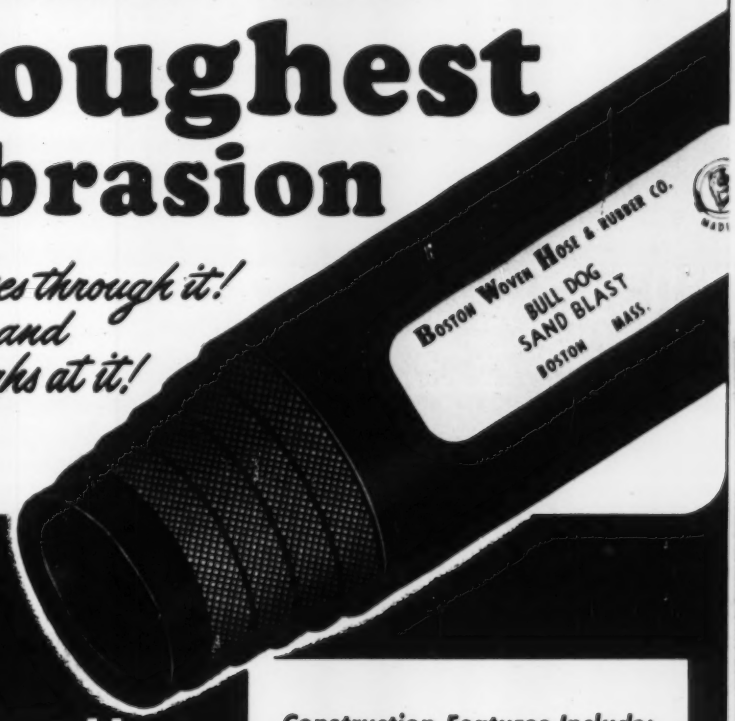
Nonferrous Cut-off Saw

USE REPLY CARD—CIRCLE No. 7

Fully automatic cut-off saw for nonferrous metals, called the Comet MH, is introduced by Consolidated Machinery & Supply Co., 2031 Santa Fe Ave., Los Angeles 21, Calif. Machine uses a high-

Takes the Toughest Abrasion

Lives through it! and Laughs at it!



BULL DOG Sand Blast Hose

is the hose that your most exacting requirements designed

Construction Features Include:

A tube of highest grade abrasion-resistant rubber that is also static conducting; a carcass fashioned of strong, rubberized duck plies which give wall support to the hose; a highly abrasion-resistant cover and capped ends.

Get in touch with your supplier today . . . put BULL DOG SAND BLAST HOSE to work for you as soon as you can.

FOR HERE'S the hose that takes the "gaff" . . . withstands the toughest use and abuse . . . and comes through with flying colors.

You can't equal its long-lived performance for pressure blasting with sharp sand, steel shot or other abrasive materials at high velocities.

And you will find it of equally unsurpassed stamina in the cleaning or finishing of castings, stone, glass or other materials.

BWH

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

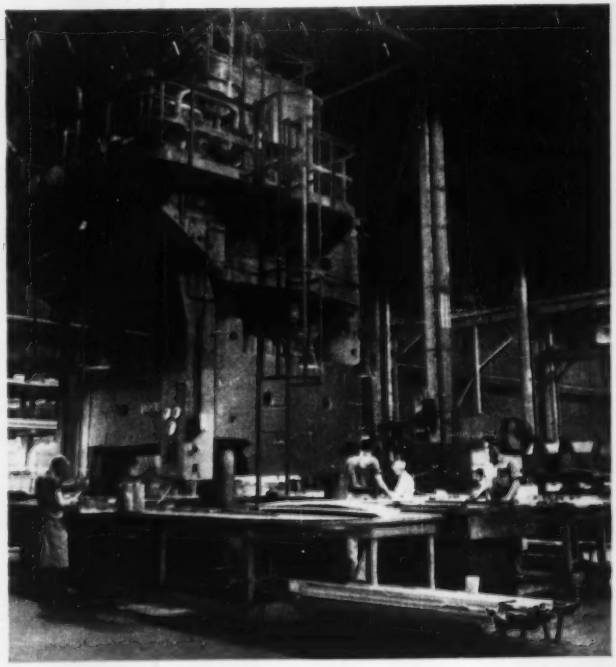
Warehouse Stock: 111 N. Canal St., Chicago, Illinois **Distributors in all Principal Cities**

PLANT: CAMBRIDGE, MASS. · P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

BIRDSBORO *Hydraulic Press* helps speed *CONVAIR B-36 PRODUCTION*

BIRDSBORO hydraulic presses have made a name for themselves in the aircraft industry as well as other metalworking plants by stepping up production of formed metal parts.

BIRDSBORO presses are made in a wide range of types and sizes engineered for high efficiency and economy in the specific jobs for which they are intended. For competent help in solving your press problems, you can call on and depend on BIRDSBORO engineers.



5,000 ton hydraulic rubber pad press with automatic four station, four-way shuttle type loading tables.

BIRDSBORO

STEEL FOUNDRY & MACHINE CO.

Birdsboro, Penna.

HYDRAULIC PRESSES

Designers and Builders of:

Hydraulic Presses • Special Machinery • Steel Castings
Crushing Machinery • Rolls • Steel Mill Machinery

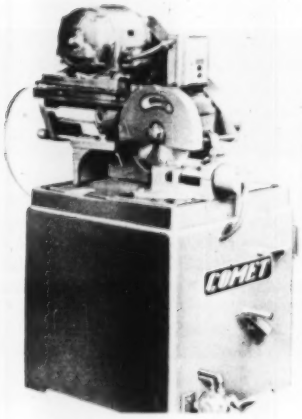
AGENTS IN:

Boston, Massachusetts — Cincinnati, Ohio — Dayton, Ohio — Kansas City, Missouri — Los Angeles, California—Oklahoma City, Oklahoma —Pittsburgh, Pennsylvania—St. Louis, Missouri —Tulsa, Oklahoma

HP 10-51-R

speed, carbide-tipped circular blade to cut aluminum shapes up to 3 x 5 inches or solids to 2 x 4 inches. Some cuts of about 2 x 4 inches aluminum bar stock (24 ST hardness) take less than 8 seconds and are held to acceptably close tolerances. Vise and 12-inch saw blade have maximum capacity of $3\frac{1}{2}$ x 6 inches.

In operation, work is placed in the vise and foot control depressed



. . . automatic operation at close tolerances

to actuate pneumatic-hydraulic feed ram, lock the vise and make the cut. When cut is completed, saw retracts rapidly and automatically to starting position, vise opens and work is released. If the operator removes his foot from the control during the cut, the saw stops its forward motion immediately and retracts. Vise, however, remains tightly locked until blade is clear of the cut. Ram feed rate is infinitely adjustable from 0 to 24 fpm.

Heavy-Duty Turning Rolls

USE REPLY CARD—CIRCLE No. 8

Addition of the model M-1500 to its line of heavy-duty turning rolls is announced by Reed Engineering Co., Carthage, Mo. Roll has 75-ton capacity, with one power unit and two idler units. It handles vessels to 14-foot diameter. Motor-variable speed transmission gear reducer is set with a range from 5 to 40 inches per minute. Worm gear reducer and antifriction bearings are totally enclosed. The 5-hp motor is protected with

when the job is tough . . .

USE "HARD-DUR" GEARS

they preserve the tooth form

• "HARD-DUR" Gears not only preserve tooth form because the material is highly wear resistant and the gears are scientifically heat treated to obtain maximum physical properties...but they have involute teeth that are produced to high standards of accuracy by very careful workmanship. In fact "HARD-DUR" Gears are so much stronger, harder and more wear-resistant, that they are guaranteed to have at least four or five times the life of similar untreated gears...and at only 50% extra in cost.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for 488-Page Catalog 49

reverse magnetic starter and reversing relays.

Polisher Speeds Hit 1160 rpm

USE REPLY CARD—CIRCLE No. 9

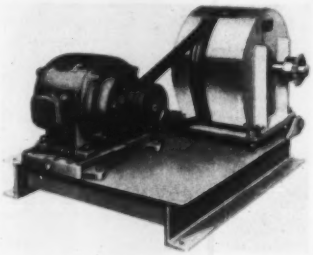
Conical disk and belt drive from a ¼-hp motor are features of a metallographic polisher made by Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa. Unit offers polishing head speeds from 112 to 1160 rpm, all at full torque regardless of specimen pressure on the head. Introduced with the polisher is a 62 x 24-inch table that accommodates two polishing units. Set-up is designed to permit rough and fine polishing at one station.

Model has a 9-inch head, easily removable by locking clutch mechanism. Rotation of speed is variable to any desired rate and is maintained automatically.

Drive Unit Cuts Shock Load

USE REPLY CARD—CIRCLE No. 10

Drive unit applicable for industrial uses that require rapid start-stop operation is offered by Merritt-Solem Corp., Lockport, N. Y. Drive operates where shock loads create a maintenance problem in clutch and brake assemblies because of a limited time cycle. Heavy-duty electro magnet is attached to the flywheel and rotated



. . . where start-stop operation is required

at constant speed. Two heavy-duty steel armatures are mounted on a tapered hub and spline assembly and a second electro magnet is mounted to the end plate. Attraction of armatures to the magnets as the latter are energized causes shaft to stop or start as desired. Energizing and de-energizing of magnets is accomplished through a timing cam or limit switches.

One field indicated by the design is in conveyor drives, particularly where stop-start operation is necessary. Semi-automatic and full automatic start-stop can be adapted easily. Other applications include indexing tables, punches, stitchers or loaders. Model, called CCB-50, is limited to a maximum 5 hp with output shaft speed at 600 rpm.

Portable Wet and Dry Vacuum

USE REPLY CARD—CIRCLE No. 11

Heavy-duty portable vacuum, made with a 55-gallon tank, is offered by Hild Floor Machine Co., 740 W. Washington Blvd., Chicago 6, Ill. Tank holds 5 bushels of dry dirt or 40 gallons of recovered liquid. For easy handling, entire unit is mounted on a steel dolly fitted with a hinged handle and three ball-bearing casters.

Contents of the tank can be emptied easily through a 2-inch,

quick-opening gate valve. Vacuum hose is 20 feet long, made throughout of oil-resistant synthetic rubber, wire reinforced for extra strength. Cleaner can pick up either liquid or dry substance without adjustment or part change. It employs a by-pass motor that does not depend on vacuum air stream for cooling.

Shaft-Mounted Speed Reducer

USE REPLY CARD—CIRCLE No. 12

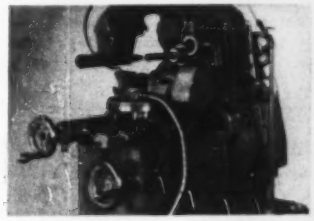
Double reduction shaft-mounted speed reducer with capacity to 43 hp and made for output speeds from 12 to 110 rpm, is announced by Dodge Mfg. Corp., Mishawaka, Ind.

Model No. 7 is rated 59 per cent greater horsepower capacity than the company's previous model 6. As in models introduced previously, the No. 7 is shaft-mounted and anchored with torque-arm that fastens to any fixed object. A turnbuckle permits fast, easy adjustment of belt tension. It requires no foundation and no flexible couplings. The company's automatic Tri-Matic overload release is applicable to the current model.

Collet Adds to Hobber Accuracy

USE REPLY CARD—CIRCLE No. 13

Handwheel operated draw bar collet is added as standard equipment on No. 1 gear hobbers made by Hamilton Tool Co., Hamilton, O. Faster and easier to operate,



. . . reduces loading and unloading time

the collet speeds the machine's production by reducing time required for loading and unloading. An additional feature of the revised spindle design is an adjustable spindle nose, installed to assure trueness of workpiece to within 0.0001-inch, and simplify adjustment for trueness when a change is made from collet to workholding fixture. Machine's independent selection of speed, feed and indexing is unchanged.

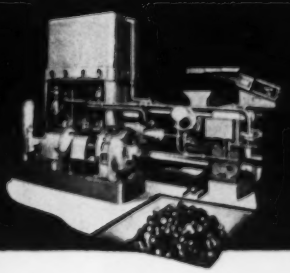
Skid Handles Long Parts

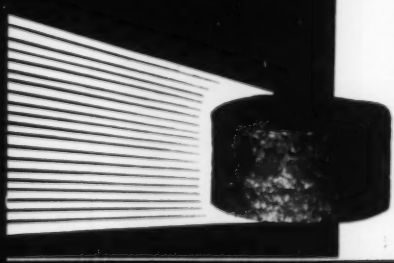
USE REPLY CARD—CIRCLE No. 14

Two-wheeled trailer designed for handling long lengths of materials in confined spaces is a development of Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3, Pa. Pulled by fork or platform lift truck, the unit is also adaptable for transporting multiple palletized loads and for general plant hauling. In operation, lift truck engages coupling mechanism mounted on an articulated turntable, lifts the skid legs free from the ground and moves the unit on its rear wheels.

Cranes can be used to load and unload the Trail-Skid and the model can be used with or without stakes. Trailer is available in five models, ranging in length from 7 to 16 feet. All models have a ca-

with a MILWAUKEE BRIQUETTING PRESS





Convert low-grade bulk borings, turnings, chips and shavings into compact high-grade briquettes with the **press that pays for itself!** The MILWAUKEE Briquetting Press effects substantial savings by conserving vital metals, providing close scrap control, and reducing scrap handling and storage costs.

Automatic in operation, the MILWAUKEE Press handles steel, aluminum, cast iron, bronze, magnesium, brass and other metals at rates up to 3½ tons per hour. Briquettes produced can be charged directly into furnace or foundry cupolas. In most plants, savings pay for press in less than one year.

Write today for 8-page illustrated Bulletin No. 117 for complete data on six models available.

Foundry Equipment Division

6495 GRAND DIVISION AVENUE • CLEVELAND 25, OHIO

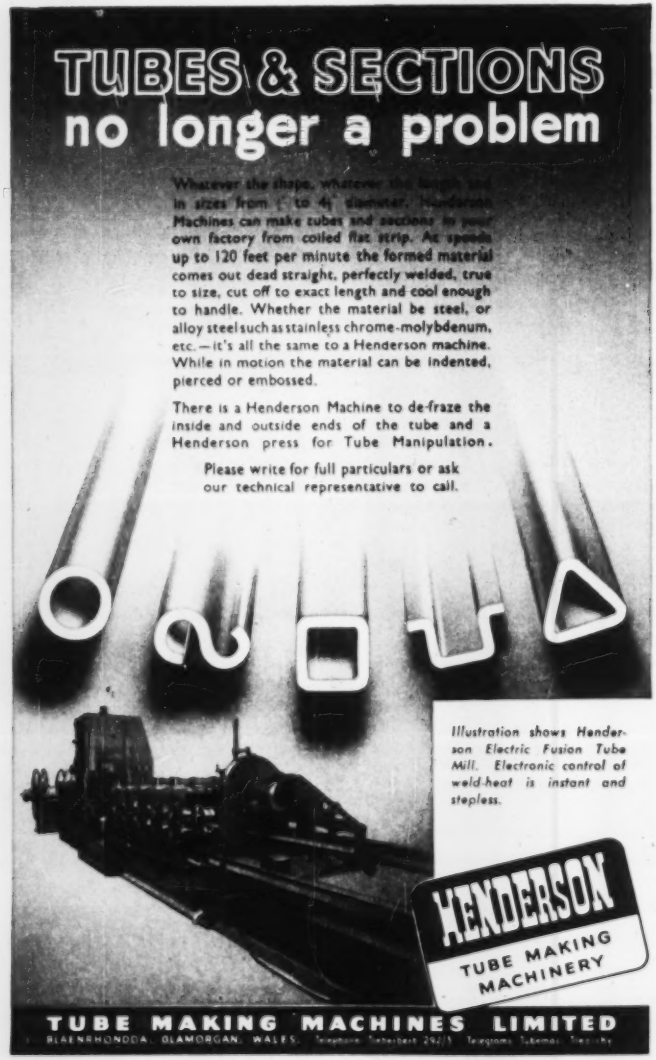
pacity of 10,000 pounds and feature solid rubber-tired wheels with Timken roller bearings. For maneuvering in areas with a minimum space, a load 24 feet long can be turned at 90 degrees in intersecting aisles 14 feet 4 inches.

Bench Model Chrome Plater

USE REPLY CARD—CIRCLE No. 15

Cro-Plate Co. Inc., Hartford, Conn., offers its model 100, a self-contained hard chrome plating unit meeting all electroplating requirements. The bench-type model is designed to permit shops to do their own plating. It takes 2 x 3-foot space, including all apparatus in one unit. Single current source and duct outlet are the only connections needed for immediate operation.

Tank is lead-lined, but lining can be changed for plating other metals. Tank heat results from easily-removed 1500-w electric heaters. All circuits are overload protected with self-resetting, heater-type switches. Unit provides a rectified source of direct current power up to 100 amp at 0 to 12 v.


TUBES & SECTIONS
no longer a problem
Whatever the shape, whatever the length and in sizes from ¼ to 4½ diameter, Henderson Machines can make tubes and sections to your own factory from coiled flat strip. At speeds up to 120 feet per minute the formed material comes out dead straight, perfectly welded, true to size, cut off to exact length and cool enough to handle. Whether the material be steel, or alloy steel such as stainless chrome-molybdenum, etc.—it's all the same to a Henderson machine. While in motion the material can be indented, pierced or embossed.
There is a Henderson Machine to de-fraze the inside and outside ends of the tube and a Henderson press for Tube Manipulation.
Please write for full particulars or ask our technical representative to call.
Illustration shows Henderson Electric Fusion Tube Mill. Electronic control of weld-heat is instant and stepless.
HENDERSON
TUBE MAKING MACHINERY
TUBE MAKING MACHINES LIMITED
PLAENRHONDDA, GLAMORGAN, WALES.

Measures Bore and Hole Sizes

USE REPLY CARD—CIRCLE No. 16

Brown & Sharpe Mfg. Co., Providence 1, R. I., offers Intrimik, an internal tri-point micrometer to measure bores and holes directly without masters. Instrument takes inside measurements directly in increments of 0.0001-inch from 0.275 to 0.500-inch or 0.0002-inch from 0.500 to 4.000-inches at depths of 2 inches in the three small sizes and 3 inches in the large sizes.

Hooded Bin for Small Parts

USE REPLY CARD—CIRCLE No. 17

A hooded bin to protect small parts and materials from dust and to permit easier handling is available from Stackbin Corp., Pawtucket, R. I. Hood is fastened in closed position by a positive latch that is released by light finger pressure.

Pocket Size Pyrometer

USE REPLY CARD—CIRCLE No. 18

Model No. 327-T, a pocket-size pyrometer made by L & L Mfg. Co., Chester, Pa., weighs 10 ounces. It immediately registers 400 to 2250° F, also to 1250° C. It is calibrated for 1/16-inch steel panel.

Explosion-Proof Fixture

USE REPLY CARD—CIRCLE No. 19

AA-51 series explosion-proof light fixture, made by Appleton Electric Co., Chicago 13, Ill., is available in sizes ranging from 60 to 500 w. It features full circle venting, use of the entire lower edge of the hood as a continuous louvre. This feature, combined with porous metal interior, provides more even heat distribution.

Rubber Shapes Bonded to Metal

USE REPLY CARD—CIRCLE No. 20

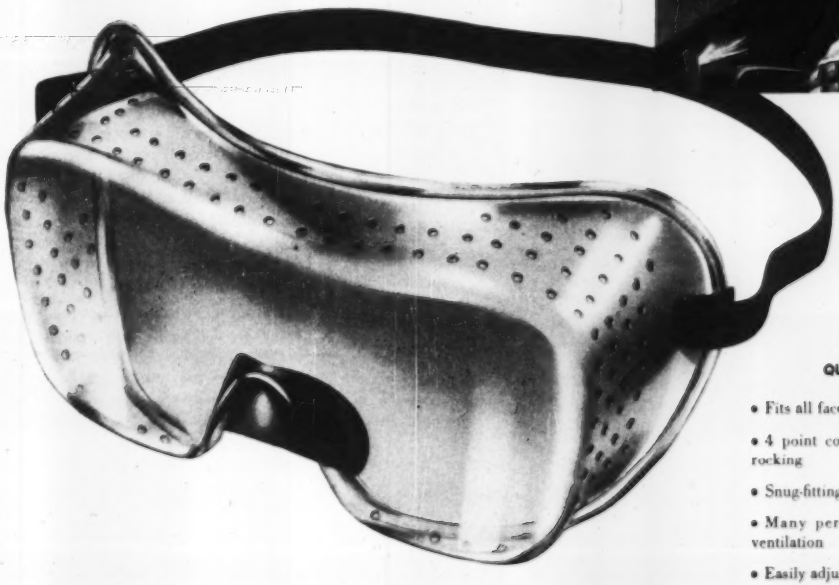
Andrews-Alderfer Co., Akron, O., announces specialized or custom-fabricated parts consisting of molded rubber shapes bonded to any ferrous or nonferrous metal component or to various ceramic compositions. A wide variety of sizes and shapes can be produced for ap-

Eye Accidents Cut Production!

PROTECT YOUR WORKERS' EYES

with this INEXPENSIVE All-Plastic Goggle

Safety Goggles



QUICK FACTS

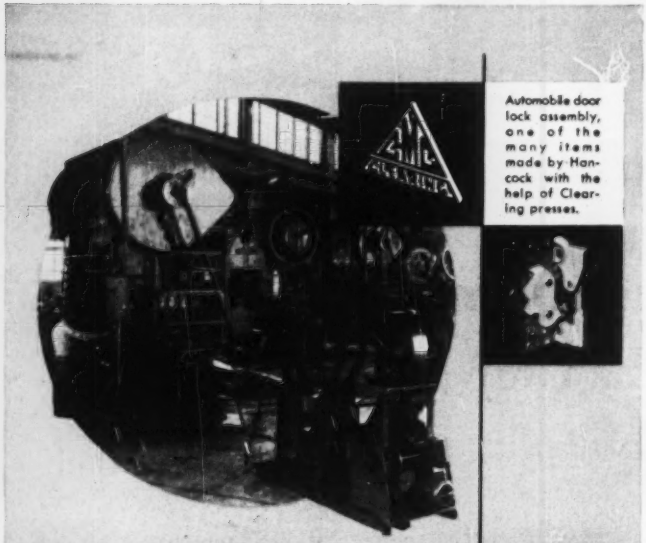
- Fits all faces comfortably
- 4 point contact to face, resists rocking
- Snug-fitting, plastic nosepiece
- Many perforations for good ventilation
- Easily adjusted, elastic headband

This one-piece goggle (AO 479 Clear, AO 480 Green) is recommended for protection against foreign particles striking from the front or sides. Its impact-resisting plastic is "optically correct"—meets government specifications. Its wide angle vision is an outstanding feature as are its NON FOGGING, WELL-VENTILATED and NON FLAMMABLE advantages. Can be worn comfortably over most personal glasses. Your nearest AO Safety Products Representative can supply you.

AO's Industrial Vision Program increases production, decreases accidents. Write today for free booklet "Improved Industrial Vision."

American Optical
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES



Automobile door lock assembly, one of the many items made by Hancock with the help of Clearing presses.

VALUE at a FAST PACE

In Jackson, Michigan, the Hancock Mfg. Co., producers of automobile hardware, like the way this bank of Clearing presses stick to their jobs. Long experience with high-volume, high-tempo, production runs has made Hancock a pretty good judge of press stamina.

Their Clearings are giving steady performance at high speed with practically no maintenance. Die regrinds are infrequent because Clearing's precision slide action holds die wear to a minimum.

Advantages like these mean a lot to Hancock... and to you, too. For production your best choice is Clearing.

CLEARING MACHINE CORPORATION
6499 WEST 65TH STREET ★ CHICAGO 38, ILLINOIS
HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES
THE WAY TO EFFICIENT MASS PRODUCTION

plication in processing equipment of all types, control valves, electric control devices, conveyors, heat treating equipment, etc.

Safety Tongs

USE REPLY CARD—CIRCLE No. 21

Durable safety tongs for metalworking industry, made by Atlas Welding Accessories Co., Ferndale 20, Mich., are of drop forged steel with long broad nose members to provide a firm grip. Nose members are also thin at the tip.

Carbide Commutator Saw

USE REPLY CARD—CIRCLE No. 22

Gay-Lee Co., Clawson, Mich., has developed a hub-type solid carbide saw designed for commutator undercutting. It can also be used on other slitting and slotting work. It features a brazed ring that forms part of hub to make hub and solid carbide blade completely bonded and rigid.

Eliminates Need of Tamping

USE REPLY CARD—CIRCLE No. 23

A water binder investment that produces a hard, smooth surface is available from Royaloy Inc., New York 3, N. Y. Setting time can be regulated for fast or slow setting. No tamping is required.

All Metal Wear Plate

USE REPLY CARD—CIRCLE No. 24

Michigan Powdered Metal Products Co. Inc., Northville, Mich., offers a stored lubricant wear plate. The all metal plate is a single piece containing a large internal cavity that is filled with an extremely porous, yet rigid, metal sponge containing lubricant.

Automatic Air Oiler

USE REPLY CARD—CIRCLE No. 25

BR automatic air oiler for the lubrication of all pneumatic tools and machines is available from Robinson & Lee, New York 17, N. Y. Adaptable to any cubic foot

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

TEAR OUT CARD, FILL IN and MAIL TODAY!

71. Large DC Motors

Allis-Chalmers Mfg. Co. — When you send for 40-page booklet 05B6002A you are getting a splendid presentation on large direct current motors and controls for heavy duty drives. Many photographs are included and much descriptive information is given for this equipment.

72. Hand Trucks

Standard Pressed Steel Co.—Offered in eight models from light weight to heavy duty, line of Uni-Truk hand trucks is described and illustrated in folder No. 815. Specifications are given. Trucks are of all-welded steel construction and have concave cross members and side bars for strength.

73. Tool Steel Electrodes

Alloy Rods Co.—Just off the press is 8-page illustrated bulletin AR52-1 which gives technical and "how to do it" information on Tool-Arc tool steel electrodes for welding tools and dies. Oil, water and air hardening; hot work; high speed and work hardening electrodes are covered.

74. Combustion Control

Bailey Meter Co.—24-page illustrated bulletin 1023 is detailed account of tried-and-proved automatic combustion control techniques for oil and gas fired boilers. Nine typical firing methods and 16 major control components are presented diagrammatically. Facts and figures are cited for 300 installations ranging in capacity from 6000 to 1,000,000 lb hr of steam.

75. 3-Dimensional Microscopes

Bausch & Lomb Optical Co.—Photos and sketches in 20-page brochure D-15 illustrates various models of Stereomicroscopes, whose three-dimensional feature provides magnified image which is both stereoscopic and unreversed. Also pictured and described are such features as dust proof seal in prism housing, interchangeable objectives, wide focusing rack, and rotatable models. Price list on Junior and Senior instruments and accessories is supplemented.

76. Pipe Tools

Beaver Pipe Tools—28-page illustrated brochure entitled "Beaver Pipe Tools" catalogs with full description and specifications the complete line of Beaver pipe threaders, cutters, geared cutters and threaders, power drives, pipe & bolt machines, reamers and accessories. Catalog offers tips on how to locate and correct pipe machine troubles and how to get best results from hand pipe tools.

77. Selenium Rectifiers

Bart-Messing Corp. — Descriptions, drawings and photos of complete line of Sel-Rex selenium rectifiers are contained in booklet "A Guide to Better Plating Power." Direct current power requirements are discussed and equipment recommendations for low-cost, efficient operations are given.

78. Sling Chains

American Chain & Cable Co., American Chain Div.—32-page illustrated catalog DH-314 gives you a wealth of information, both general and specific, on Acco registered sling chains. Included are ordering information, advantages and limitation of each type and metal used, specifications of each type, working load limits and other data.

79. Tubing Applications

Babcock & Wilcox Tube Co. How hundreds of different parts can be made economically from B & W mechanical tubing is theme of 4-page illustrated bulletin TB-324. Outlined are types, analyses, sizes, surface finishes, specifications, quality and available shapes of mechanical tubing.

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80. Heat Treating Equipment

American Gas Furnace Co. — 24-page catalog No. C-1304 contains descriptions, specifications and illustrations of equipment for heat treating. Included are: gas carburizers; pot and continuous furnaces; forges; blowpipes and burners; rotary tempering furnaces; high speed, oven and bell-oven furnaces; automatic quenching tanks; tube furnaces; pyrometers; and blowers.

81. Precision Instruments

Associated Research, Inc. — Basic data on electrical insulation and ground resistance testers, units for checking high potential dielectric strength, instrument transformers, voltmeters, volt-ammeters and other special purpose electrical instruments are given in 8-page illustrated bulletin 10A.

82. Alternate Stainless Steel

Armco Steel Corp. — Applications, properties and care of Armco 17 chromium stainless steel (type 430) are covered in 6-page illustrated bulletin "Where To Use 17 Chromium Stainless as an Alternate for 18-8." Photographs show typical and varied applications.

83. Fire Protection

"Automatic" Sprinkler Corp. of America—36-page illustrated manual "The A B C of Fire Protection" covers such subjects as the economics of fire protection, business security and available types of Automatic Sprinkler systems. Equipment is available to afford protection from practically every fire hazard.

84. Industrial Truck Care

Baker-Raulang Co., Baker Industrial Truck Div.—"Care and Maintenance of Industrial Trucks" is title of 16-page illustrated guide book No. 2100. Cited as basis for a sound maintenance program are careful operation, avoidance of overloading, and establishing and observing a preventive maintenance program. Twenty-four vital checking points on industrial power trucks are shown.

85. Investment Casting Uses

Austenal Laboratories, Inc. — Development of the Microcast process of precision investment casting through the years is covered in detail in this 16-page illustrated booklet "New Opportunities for the Creative Product and Design Engineer." Process is explained in clear, concise steps. Tables show different alloys used and hardness. Specific operations eliminated through use of the process are covered.

86. Hoisting Equipment

American Hoist & Derrick Co.—Complete line of hoisting equipment from giant revolver cranes, through locomotive cranes, hoists, material elevators, car pullers, Tractowinches, blocks and general purpose hoists to Crosby cable clips are described and illustrated in general catalog No. GC-2.

EDITORIAL REPRINTS:

87. Heavy Duty Welding

Massive components for heavy duty assemblies can be successfully welded if electrodes are properly selected and correct heat treating and welding techniques are employed. So says metallurgist F. R. Drahos in STEEL reprint "Shielded, Submerged Arc Welds Withstand Rugged Service," in which he discusses electrodes, corrosion prevention, cast-weld construction and massive welding.

88. Radiant Heat Annealing

Metallurgist C. A. Turner, Jr. in STEEL reprint "Annealing Accelerated with Radiant Heat" points out that continuous annealing can increase production rate product quality. Strip mills, for instance, can utilize direct-fired radiant gas heating equipment to heat treat strip at rate of 1000 fpm.

89. Engineered Handling

Production conversion from light peacetime products to the heavy machines of war can be too much of a strain for standard materials handling equipment. Cadillac-Cleveland tank plant engineers solved the problem by designing rugged handling equipment to withstand production of heavy tanks. Read all about it in STEEL reprint "Engineered Materials Handling . . . Lightens Burden of Heavy Tank Production."

90. Purifying Wastes

"Lagooning Purifies Metalworking Wastes" is title of STEEL reprint which reports that controlled waste treatment process can produce an effluent that meets stringent disposal requirements. As a typical example, article points to nontoxic wastes encountered in manufacture of automobile axles at the Dana Corp.

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6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
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per minute air flow, it feeds a premixed mist of oil and air to the tool or machine at each operation cycle. It is installed in the air line in a vertical position as close as possible to the unit to be lubricated.

Heavy Duty Switch

USE REPLY CARD—CIRCLE No. 26

A heavy duty electric switch, developed by Production Instrument Co., Chicago, Ill., may be operated by reciprocal motion or by complete revolution of the shaft. Although developed for electric counter actuation, it is adaptable to other applications where electrical operations need to be synchronized with mechanical operation.

Controls Depth of Hole

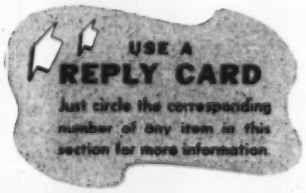
USE REPLY CARD—CIRCLE No. 27

Scully-Jones & Co., Chicago 8, Ill., offers a drill stop for use on turret lathes, drill presses and radial drills for operations like center drilling, drilling and reaming where close control of depth is required. On these operations or wherever a quick change arrangement is used in one station for sequence operations, uniform hole depth can be held by using the stop.

Overload Relays

USE REPLY CARD—CIRCLE No. 28

For use in squirrel cage, synchronous and wound-rotor motor starters and controllers, Electric Controller & Mfg. Co., Cleveland 4, O., offers type ZTM Thermal-Magnetic overload relays. Independent thermal and instantaneous tripping elements are operated from one magnetic source. Thermal element provides timed response to thermal energy of motor load currents by a U-shaped bimetal connected to secondary of magnetic circuit.



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Presteel specializes in the solution of unusual stamping problems, the design and re-design of component parts; has pioneered in the application of new methods and in holding close tolerances in all kinds of metals. Much of Presteel's work is beyond the capacities of other stampers.

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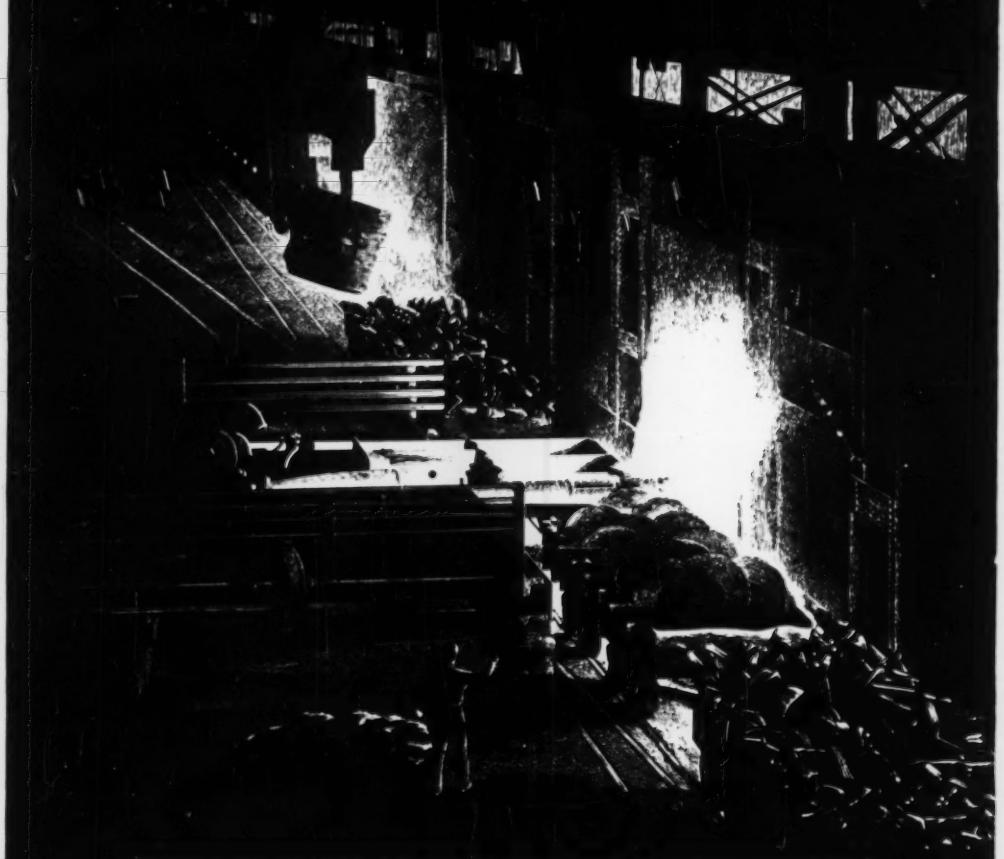
"PRESTEEL...where problems are shaped into products"

for the purchase or sale of **scrap**



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LURIA BROTHERS AND COMPANY, INC.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

The Market Outlook

HOW QUICKLY you can get steel depends on what you want, and what you want to pay for it.

If you want large size carbon bars or heavy plates, you'll have to wait awhile. If you want wire or straight chrome grades of stainless sheets, just say the word and you'll get quick delivery.

On some products, the availability depends on the price you want to pay. While some premium price mills are scratching for business, the regular price mills can point to full or reasonably full order books.

UNDER CONTROL— These variations result from the part-defense, part-peace and controlled economy. A change in some of the controls may alone alter the demand for a specific product. Take cold-rolled carbon steel sheets, for example. There was a noticeable easing in demand for this product because appliance sales were slow and automobile production was restricted by the government. A few weeks ago the government relaxed the restrictions on auto output. Now there's a stronger demand for cold-rolled carbon sheets.

That strengthening doesn't extend to cold-rolled carbon strip. Rollers of this product are competing keenly for business.

Hot-rolled carbon sheets continue in fairly tight supply, largely because some of the continuous sheet mills are required by the government to devote considerable time to rolling light-gage steel plate so that the conventional plate mills can spend full time on heavy and wide plate.

PROMISING— The galvanized steel sheet supply is still inadequate, but it should show some improvement from recent increases in government allocations of zinc.

Straight chrome grades of sheets are in easy supply, so much so that some mills are absorbing freight to get orders for this product.

Narrow, light plates are increasingly available but they are not solving production cost problems. While price advantages may range up to $8 a ton, added welding costs and design changes offset it.

Carbon bars, particularly the larger sizes, are the most difficult of all steel products to obtain. This tightness stems to a great extent from the military program. Now, additional demand for bars is coming from the easing of controls on automobile production. Automobile producers are reported to be seeking rolling time for conversion of their own semi-finished steel.

While not as active as carbon grades, alloy steel bars are in growing demand for rifle barrel blanks.

VARIED— Structural shape demand is strong in some areas and sluggish in others. Relaxation of government controls on construction have not had time to become fully reflected in orders for shapes.

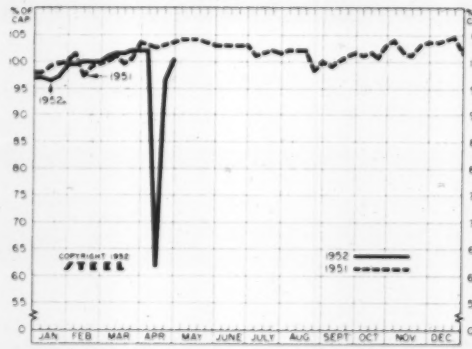
Warehouses continue to note an easing in their business. Their steel receipts are improving but their inventories still are not balanced. On some products they have become long on supply. To move some of these items, price cutting is being resorted to. On some of the light flat-rolled products Detroit warehouses are quoting prices considerably below the market and Pittsburgh area warehouses are slashing prices $20 a ton. In some instances, jobbers are declining to take their full monthly quotas of steel from mills.

EASIER SCRAP—The easing in the supply of steelmaking scrap continues. Pittsburgh mills now have better scrap inventories than they have had for months. In the East, one user quit buying No. 2 scrap. In the St. Louis area, mills are comfortably fixed with 30 to 45-day stockpiles. On the West Coast, bundles are a drug on the market, and a small mill reduced its buying prices $5 across the board for open-hearth grades of scrap.

Restoration of normal operating schedules in mills last week pushed STEEL's estimated national ingot rate up four points to 100.5 per cent of capacity.

Government seizure of the steel industry and the prospect of rising costs and declining profits prompted several steel companies either to table expansion plans or consider such a step.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Apr. 26	Change	Same Week 1951	Same Week 1950
Pittsburgh	102.5	+ 0.5	102.5	97.5
Chicago	101.5	+ 7.5	108	104.5
Mid-Atlantic	98	+ 5	101	93
Youngstown	105	+ 10	104	105
Wheeling	101.5	0	97.5	104.5
Cleveland	100.5	+ 3.5*	100	96
Buffalo	104	0	104	104
Birmingham	102	0	100	100
New England	85	0	90	85
Cincinnati	96	+ 2	105	103
St. Louis	92	+ 2	97	89
Detroit	112	+ 5*	109	104
Western	103	+ 13.5*	107	93
Estimated national rate	100.5	+ 4	103.5	100

Based on weekly steelmaking capacity of 2,077,040 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 37 Production-Engineering News—p. 73

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Apr. 24 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av. = 100)	171.92†	171.92†	171.92†	171.92	118.67
Index in cents per lb.	4.657†	4.657†	4.657†	4.657	3.215

ARITHMETICAL PRICE COMPOSITES:

Finished Steel, NT	$106.32†	$106.32†	$106.32†	$106.32	$69.82
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	52.54	32.99
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	32.49
Malleable Pig Iron, GT	53.27	53.27	53.27	53.27	33.71
Steelmaking Scrap, GT	43.00	43.00	43.00	44.00	31.33

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails; cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Preliminary

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Apr. 24 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.20	2.98
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del. Philadelphia	3.918	3.918	3.918	3.91	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.80
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.80
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.60-75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.35
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.35
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	4.125
Tin plate box, Pittsburgh	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, ½-⅝", Pitts.	4.10-.30	4.10-.30	4.10-.30	4.10-.30	2.55

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$34.00
Basic, Valley	52.00	52.00	52.00	52.00	33.00
Basic, del. Phila.	56.61	56.61	56.61	56.49	35.52
No. 2 Fdry., Pitts.	52.50	52.50	52.50	52.50	33.50
No. 2 Fdry., Chicago	52.50	52.50	52.50	52.50	33.00
No. 2 Fdry., Valley	52.50	52.50	52.50	52.50	33.50
No. 2 Fdry., del. Phila.	57.11	57.11	57.11	56.99	36.02
No. 2 Fdry., Birm.	48.88	48.88	48.88	48.88	29.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	55.33	34.75
Malleable, Valley	52.50	52.50	52.50	52.50	33.50
Malleable, Chicago	52.50	52.50	52.50	52.50	33.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	40.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.25*

* F.o.b. cars, Pittsburgh

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt., Pitts.	$44.00	$44.00	$44.00	$45.00	$32.25
No. 1 Heavy Melt., E. Pa.	42.50	42.50	42.50	43.50	30.50
No. 1 Heavy Melt., Chicago	42.50	42.50	42.50	43.50	31.25
No. 1 Heavy Melt., Valley	44.00	44.00	44.00	45.00	32.00
No. 1 Heavy Melt., Cleve.	43.00	43.00	43.00	44.00	31.50
No. 1 Heavy Melt., Buffalo	43.00	43.00	43.00	44.00	31.00
Rails, Rerolling, Chicago	52.50	52.50	52.50	52.50	36.50
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	49.00*	42.50

* F.o.b. shipping point

COKE, Net Ton

Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$14.75	$8.75-9.50
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	17.50	9.75-11.00
Oven, Fdry., Chicago	23.00	23.00	23.00	21.00	15.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	21.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	14.80-14.85
Tin, New York	121.50	121.50	121.50	142.00	80.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	50.00	50.00	42.00	33.00
Nickel, refinery, duty paid	36.50	36.50	36.50	36.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCFR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	59.75	60.25	....
Fontana, Calif. K1	58.00	58.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Geneva, Utah C11	52.00	52.50	....	....
LoneStar, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Nevillelsland, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Apr. 24, 1952; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (INT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (INT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....80.00
Houston, S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (INT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y. B2 ....56.00
Munhall, Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ....56.00

Carbon, Forging (INT)
ssener,Pa. U5 ....$66.00
R2 ....66.00
o,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ....73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah C11 ....66.00
Houston, S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ....66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ....66.00
So.Duquesne,Pa. U5 ....66.00
So.SanFrancisco B3 ....85.00

Alloy, Forging (INT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ....77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 ....70.00
Houston, S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ....70.00
Los Angeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 ....70.00
So.Duquesne,Pa. U5 ....70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (INT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (INT)
Fontana,Calif. K1 ....$80.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 ....4.40
AlabamaCity,Ala. R2 ....4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston, S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.30
No.Tonawanda,N.Y. B11 ....4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ....4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ....3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah C11 ....3.95
Houston, S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....5.90
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5 W14 ....3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. (14) B2 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y-1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14) B2 ....5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ....3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Aliquippa,Pa. J5 ....5.50
Lackawanna,N.Y. B2 ....5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala. T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ....5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ....6.25
Gary,Ind. U5 ....5.65
Geneva,Utah C11 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y-1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ....5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ....5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ....4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ....4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ....3.95
Ashland,lcl (15) A10 ....4.45
Cleveland,c.l. R2 ....4.30
Warren,O.c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky. (15) A10 ....3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ....4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif. (30) K1 ....4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah C11 ....3.70
Harrisburg,Pa. C5 ....6.30
Houston, S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5 W14 ....3.70
SparrowsPoint,Md. B2 ....3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 ....3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva,Utah C11 ....4.85

PLATES, Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston, S5 ....4.10
Ind.Harbor,Ind. I-2 Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.55
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11 ....3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle,Bq. N14 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
So.Chicago R2, U5, W14 ....3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco S7 ....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston, S5 ....4.70
Ind.Harbor,Ind. I-2 Y1 ....4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2, U5, W14 ....4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ....6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ....5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 ....4.55
Buffalo, B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay,Wis. F7 ....4.55
Hammond,Ind. L2, M13 ....4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. S5 ....4.55
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ....5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 ....5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 ....5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.75
Franklin,Pa. (3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ....4.85
Huntingtn,W.Va.(3) W7 ....5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) R2 ....4.80
Tonawanda(3,4) B12 ....4.75
Williamsport(3) B19 ....5.00
Williamsport,(4) B19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 ....15.00
Dover,(Eng.Bolt) U1 ....13.50
Dover,(Wrgh.Iron) U1 ....12.25
Economy,Pa.(S.R.) B14 ....9.60
Economy,Pa.(D.R.)B14 ....11.90
Economy,(Staybolt)B14 ....12.20
McK.Rks.(Staybolt)L5 ....14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ....3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston, S5 ....4.10
Ind.Harbor,Ind. I-2 Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.55
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So.Chicago R2, U5, W14 ....3.70
So.SanFrancisco B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....3.85
Youngstown U5, Y1 ....3.70

BARS, Reinforcing (Mills)
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston, S5 ....4.10
Ind.Harbor,Ind. I-2 Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.55
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 ....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3 ....4.60
So.Chicago R2, U5, W14 ....3.70
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ....3.70
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ....5.50
Johnstown,¼-1" B2 ....4.75
LosAngeles B3 ....5.45
Marion,O. P11 ....5.00
Seattle B3, N14 ....5.55
So.SanFrancisco B3 ....5.45
SparrowsPt. ¼-1" B2 ....4.75
Williamsport,Pa. S19 ....5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ....3.60
Ashland,Ky.(8) A10 ....3.60
Butler,Pa. A10 ....3.60
Cleveland J5, R2 ....3.60
Conshohocken,Pa. A3 ....4.00
Detroit, M1 ....4.40
Ecorse,Mich. (8) G5 ....3.80
Fairfield,Ala. T2 ....3.60
Fontana,Calif. K1 ....4.55
Gary,Ind. U5 ....3.60
Geneva,Utah C11 ....3.70
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1 ....3.60
Irvin,Pa. U5 ....3.60
Lackawanna,N.Y. B2 ....3.60
Munhall,Pa. U5 ....3.60
Niles,O. N12 ....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 ....3.60
Sharon,Pa. S3 ....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ....3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 ....3.60
Weirton,W.Va. W6 ....3.60
WestLeechburg,Pa. A4 ....3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ....4.75
Dover,O. R1 ....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. R6 ....5.65
Niles,O. N12 ....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R. (14 ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 ....5.40
Conshohocken,Pa. A3 ....5.65
Ecorse,Mich. G5 ....5.95
Fairfield,Ala. T2 ....5.40
Fontana,Calif. K1 ....6.35
Gary,Ind. U5 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
Ind.Harbor,Ind. Y1 ....5.90
Irvin,Pa. U5 ....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ....5.40
Sharon,Pa. S3 ....5.40
So.Chicago,Ill. U5 ....5.40
SparrowsPoint(36) B2 ....5.40
Warren,O. R2 ....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ....5.40
Youngstown Y1 ....5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 ....6.65
Ecorse,Mich. G5 ....7.10
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.55
IndianaHarbor,Ind. Y1 ....7.05
IndianaHarbor,Ind. I-2, ...6.55
Irvin,Pa. U5 ....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 ....6.55
SparrowsPoint(38) B2 ....6.55
Warren,O. R2 ....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 ....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.35
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
Granite City,Ill. G4	5.65
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Gal'd No. 10 Steel

Alabama City,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
Granite City,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
Martins Ferry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.53
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(29) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.85
Gary,Ind. U5	4.65
Granite City,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
Granite City,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
Granite City,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.70
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16 Pure Iron

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.80	
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
Indiana Harbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	
Martinsby,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	
SparrowsPt. B2	5.60	
Torrance,Cal. C11	6.35	

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.60	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
Granite City,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.95	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R. (22 Ga.) COILS (Cut Lengths 1/32 lower)

	Field	Armature	Electric	Motor	Dynamo
Beech Bottom,W.Va.(cut lengths)		7.25	8.50		9.30
Brackenridge,Pa.		7.75	9.00		9.80
Granite City,Ill.G4 (cut lengths)		7.95	9.20		
Ind.Harbor,Ind. I-2	6.95	7.25	(34)		
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)		6.75	7.25		
Vandergrift,Pa. U5		7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10		7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/32 lower)

Transformer Grade	72	65	58	52
Beech Bottom,W.Va.(cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35			
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35			
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)			14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEET, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEET, Long Terne Steel (Commercial Quality)

Beech Bottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind Harb., Ind. I-2	5.30
Indiana Harbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
Los Angeles (25) B3	6.05
Seattle B3	6.30
Sharon, Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W. Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta, A11	4.05
Bessemer,Ala. T2	3.50
Bridgeport,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
Kansas City,Mo.(2) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
Los Angeles R3	4.25
Milton,Pa. S6	4.35
Minnequa,Colo. C10	4.55
New Britain(10) S15	4.00
No.Tonawanda,N.Y. R11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
San Francisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B2	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
West Leechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeprt.Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
Kansas City,Mo. S5	6.10

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7		6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1			7.70	9.65	
Carnegie,Pa. S18		6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65		
Detroit D2	5.60	6.65	7.25		
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
Franklin Park,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18			7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
New Britn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
New Castle,Pa. B4	5.35	6.80	7.40	9.35	
New Castle,Pa. E5	5.50	6.80	7.40	9.35	11.65
New Haven,Conn. D2	5.85	6.75	7.35		
New York W3		7.10	7.70	9.65	11.95
Pawtucket,R.I. NS: Cleve.or Pitts-Base		6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5		7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester, Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown CS		6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5			10.30	12.50	15.35
Harrison,N.J. C18			10.30	12.50	15.35
New York W3			10.30	12.50	15.35

STRIP, Cold-Rolled Carbon

Anderson,Ind.(49) G6	5.50
Berea,O. C7	6.60
Bridgeport,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.20
Franklin Park,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
Los Angeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
New Britain(10) S15	5.35
New Castle,Pa. B4	5.35
New Castle,Pa.(40) E5	5.25
New Haven,Conn. D2	5.85
New Haven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) NS	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown CS (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown CS	5.25

Key to Producers

A1	Acme Steel Co.	C10	Colorado Fuel & Iron
A3	Alan Wood Steel Co.	C11	Columbia-Geneva Steel
A4	Allegheny Ludlum Steel	C12	Columbia Steel & Shaft
A7	American Steel & Wire	C13	Columbia Tool Steel Co.
A8	Anchor Drawn Steel Co.	C14	Compressed Steel Shaft
A9	Angell Nail & Chaplet	C16	Continental Steel Corp.
A10	Armco Steel Corp.	C17	Copperweld Steel Co.
A11	Atlantic Steel Co.	C18	Crucible Steel Co.
A13	American Cladmetals Co.	C19	Cumberland Steel Co.
		C20	Cuyahoga Steel & Wire
B1	Barock & Wilcox Co.	C22	Claymont Steel Corp.
B2	Bethlehem Steel Co.		
B3	Beth. Pac. Coast Steel	D2	Detroit Steel Corp.
B4	Blair Strip Steel Co.	D3	Detroit Tube & Steel
B5	Bliss & Laughlin Inc.	D4	Disston & Sons, Henry
B6	Bolardi Steel Corp.	D6	Drived Harris Co.
B8	Braeburn Alloy Steel	D7	Dickson Weatherproof Nail Co.
B11	Buffalo Bolt Co.		
B12	Buffalo Steel Co.	E1	Eastern Gas&Fuel Assoc.
B14	A. M. Byers Co.	E2	Eastern Stainless Steel
		E4	Electro Metallurgical Co.
C1	Calstrip Steel Corp.	E5	Elliott Bros. Steel Co.
C2	Calumet Steel Div. Borg-Warner Corp.	E6	Empire Steel Corp.
C4	Carpenter Steel Co.	F2	Firth Sterling Steel
C5	Central Iron & Steel Div. Harsha Steel Corp.	F3	Fitzsimons Steel Co.
C7	Cleve. Cold Rolling Mills	F4	Follansbee Steel Corp.
C8	Cold Metal Products Co.	F5	Franklin Steel Div. Borg-Warner Corp.
C9	Colonial Steel Co.	F6	Fretz-Moon Tube Co.
		F7	Ft. Howard Steel & Wire
		G2	Globe Iron Co.
		G3	Globe Steel Tubes Co.
		G4	Granite City Steel Co.
		G5	Great Lakes Steel Corp.
		G6	Greer Steel Co.
		H1	Hanna Furnace Corp.
		I-1	Igoe Bros. Inc.
		I-2	Inland Steel Co.
		I-3	Interlake Iron Corp.
		I-4	Ingersoll Steel Div. Borg-Warner Corp.
		I-7	Indiana Steel & Wire Co.
		J1	Jackson Iron & Steel Co.
		J3	Jessop Steel Co.
		J4	Jonhson Steel & Wire Co.
		J5	Jones & Laughlin Steel
		J6	Joslyn Mfg. & Supply
		J7	Judson Steel Corp.
		J8	Jersey Shore Steel Co.
		K1	Kaiser Steel Corp.
		K2	Keokuk Electro Metals
		K3	Keystone Drawn Steel
		K4	Keystone Steel & Wire
		L1	Laclede Steel Co.
		L2	LaSalle Steel Co.
		L3	Latrobe Electric Steel
		L5	Lockhart Iron & Steel
		L6	Lone Star Steel Co.
		L7	Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeport,Conn. (10)81S	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn.(10)81S	10.75
Pawtucket,R.I.(11) N8	10.75
Pawtucket,R.I.(12) N8	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.50
Youngstown C8	10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.06
Riverdale,Ill. A1	3.99
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, Merchant Quality

	(6 to 8 gage)	An'ld	Galv.
AlabamaCity	R2	5.70	5.95
Aliquippa	J5	5.70	6.15
Atlanta	A11	5.95	6.40
Bartonville(19)	K4	5.70	6.15
Buffalo	W12	4.85	
Cleveland	A7	5.70	6.15
Crawfordsville	M8	5.95	6.40
Donora,Pa.	A7	5.70	6.15
Duluth,Minn.	A7	5.70	6.15
Fairfield	T2	5.70	6.15
Houston,Tex.	S5	6.10	6.55
Johnstown	B2	5.70	6.15
Joliet,Ill.	A7	5.70	6.15
KansasCty,Mo.	S5	6.30	6.75
Kokomo	C16	5.80	6.06
LosAngeles	B3	6.65	
Minnequa	C10	5.95	6.45
Monessen	P7	5.95	6.40
Palmer	W12	5.15	
Pitts.,Calif.	C11	6.65	6.80
Prtsmth.(18)	P12	6.10	6.60
Rankin	A7	5.70	6.15
So.Chicago	R2	5.70	6.95
So.S.Fran.	C10	6.65	7.10
SparrowsPt.	B2	5.80	6.25
Sterling,Ill.(1)	N15	5.70	6.15
Struthers,O.	Y1	5.70	6.15
Torrance,Cal.	C11	6.65	
Worcester	A7	6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill.	L1	8.65	8.90
Bartonville,Ill.	K4	8.55	8.80
Buffalo	W12	8.55	8.80
Fostoria,O.	S1	8.85	9.10
Johnstown,Pa.	B2	8.55	8.80
Monessen,Pa.	P16	8.55	8.80
Monessen,Pa.	P7	8.80	9.05
Muncie,Ind.	I-7	8.75	9.00
Palmer,Mass.	W12	8.85	9.10
Portsmouth,O.	P12	8.55	8.80
Roebling,N.J.	R5	8.85	9.10
SparrowsPt.	B2	8.65	8.90
Struthers,O.	Y1	8.55	8.80
Worcester	J4, T6	8.85	9.10

(A) Plow and Mild Plow
(B) Improved Plow

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.	R2	4.85
Aliquippa,Pa.	J5	4.85
Atlanta	A11	5.10
Alton,Ill.	L1	5.05
Bartonville,Ill.(1)	K4	4.85
Buffalo	W12	4.85
Chicago	W13	5.10
Cleveland	A7, C20	4.85
Crawfordsville,Ind.	M8	5.10
Donora,Pa.	A7	4.85
Duluth,Minn.	A7	4.85
Fairfield,Ala.	T2	4.85
Fostoria,O.(24)	S1	5.35
Houston	S5	5.25
Johnstown,Pa.	B2	4.85
Joliet,Ill.	A7	4.85
KansasCity,Mo.	S5	5.45
Kokomo,Ind.	C16	4.95
LosAngeles	B3	5.80
Minnequa,Colo.	C10	5.10
Monessen,Pa.	P7	5.10
Newark	6-8 ga. I-1	5.50
No.Tonawanda,N.Y.	B11	4.85
Palmer,Mass.	W12	5.15
Pittsburg,Calif.	C11	5.80
Portsmouth,O.	P12	5.25
Rankin,Pa.	A7	4.85
So.Chicago,Ill.	R2	4.85
So.SanFrancisco	C10	5.80
SparrowsPoint,Md.	B2	4.95
Sterling,Ill.(1)	N15	4.85
Struthers,O.	Y1	4.85
Torrance,Calif.	C11	5.80
Waukegan,Ill.	A7	4.85
Worcester,Mass.	A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. M8	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R5	6.15
Worcester,Mass. A7	6.15
Worcester,Mass. T6	6.50
Worcester,Mass. W12	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Muncie,Ind. I-7	8.70
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J6	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Millbury,Mass.(12) N6	8.00
Monessen,Pa. P7, P16	6.25
Muncie,Ind. I-7	6.45
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.55
Worcester,Mass. A7	6.25

WIRE, Fine & Weaving (8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. M8	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Muncie,Ind. I-7	9.10
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	141
Atlanta A11	144
Bartonville,Ill.(19) K4	144
Crawfordsville,Ind. M8	146
Donora,Pa. A7	141
Duluth,Minn. A7	141
Fairfield,Ala. T2	141
Houston,Tex. S5	149
Johnstown,Pa. B2	141
Joliet,Ill. A7	141
KansasCity,Mo. S5	153
Kokomo,Ind. C16	143
Minnequa,Colo. C10	147
Monessen,Pa. P7	146
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	148
Rankin,Pa. A7	141
So.Chicago,Ill. R2	137
So.SanFran.,Calif. C10	161
SparrowsPoint,Md. B2	143
Sterling,Ill.(1) N15	141

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFrancisco,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga.

	Col.
AlabamaCity,Ala. R2	127
Ala.City,Ala.,17-18ga. R2	214
Aliquippa,Pa.9-14½ga. J5	131
Atlanta A11	134
Bartonville,Ill.(19) K4	131
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Johnstown,17ga. 6" B2	205
Johnstown,17ga. 4" B2	208
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	139
Monessen,Pa. P7	136
Pittsburg,Calif. C11	154
Portsmouth,O.(18) P12	138
Rankin,Pa. A7	131
So.Chicago,Ill. R2	127
Sterling,Ill.(1) N15	131

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

RAILS	Std. No. 1	Std. No. 2	Std. All 60 lb	Too Rails Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50		4.00
Fairfield,Ala. T2				4.00
Gary,Ind. U5	3.60	3.50	3.55	
Huntington,W.Va. W7				5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	
Johnstown,Pa. B2				(14)4.00
Lackawanna,N.Y. B2	3.60	3.50		4.00
Minnequa,Colo. C10	3.60	3.50		4.50
Steelton,Pa. B2	3.60	3.50		
Williamsport,Pa. S19				4.75

NAILS & STAPLES, Stock To dealers & mfrs.(17)

	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonvill,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	123
Donora,Pa. A7	118
Duluth, Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	128
Houston,Tex. S5	128
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	134
Pittsburg,Calif. C11	137
Portsmouth,O. P12	134
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	134

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. 10	7.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.60
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

AXLES

Ind.Harbor,Ind. S13	5.60
Johnstown,Pa. B2	5.60

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.320
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	Mo	
18	4	1	....		1.565
18	4	2	....		1.850
20.25	4.25	1.6	12.25	3.535-3	675
19	4	2	7		2.460
18.25	4.25	1	4.75		2.125
18	4	2	9	2.445-2	45
13.5	4	3	....		1.6025
W	Cr	V	Mo		
6.4	4.5	1.9	5		0.96-0.965
6	4	3	6		1.190
1.5	4	1	8.5		0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes:

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Ritn. base.
(7) To jobbers, 3 cols. lower
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Plate only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 38 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Redrawing, mill, reshipped to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 30c.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.033"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Modart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

Quantity
PRODUCTION
of
GREY IRON CASTINGS
ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES
ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION
MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

STANDARD PIPE, T & C

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	....	+0.5	+2.5	....
¼	6.0	0.42	28.5	26.5	....	+3.5	+5.5	....
⅜	6.0	0.57	23.5	21.5	....	+10.0	+12.0	....
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	15.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36⅛% on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜"; Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜". Following make ½" and larger: Lorain, O. N3; Youngstown R2 and 36⅛% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜": Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ¼", ⅜", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3", Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ½", 2 points lower on 1", 1¼", 2" 1½ points lower on 1¼", 2½", 3", Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6-in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	12	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2¾	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding	Plates 10%	Plates 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets 10%	Sheets 20%	Cu Base Both Sides
Stainless	Carbon Base	Carbon Base			Carbon Base	Carbon Base	
302	....	....	....	....	19.75	26.24-27.50	77.00
304	25.00	29.50	....	....	24.50	27.50-27.77	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	34.00	....	....	26.00	35.92-36.50	....
317	34.50	39.00	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....
321	26.50	31.00-32.00	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	24.00	33.50-33.83	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.50	45.15	41.00	54.00	....	....	....
Inconel	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS
(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam. 15
- ⅝-in. & ¾-in. 18.5
- ⅞-in. and larger 17.5

Longer than 6 in.:
- All diams. 14

Lag bolts, all diams.:
- 6 in. and shorter 23
- over 6 in. long 21

Ribbed Necked Carriage 18.5
Blank 34
Plow 34
Step, Elevator, Tap and Sleigh Shoe 21
Tire bolts 12
Boiler & Fitting-Up Bolts 31

NUTS

H.P. & C.P. Square:	Reg. Hvy.
½-in. & smaler	15 15
⅝-in. & ¾-in.	12 6.5
⅞-in.-1⅛-in.	9 1
1⅛-in. & larger	7.5 1
H.P. Hex:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	16.5 6.5
⅞-in.-1⅛-in.	12 2
1⅛-in. & larger	8.5 2
C.P. Hex:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	23 17.5
⅞-in. & 1⅛-in.	19.5 12
1⅛-in. & larger	12 6.5

SEMIFINISHED NUTS
American Standard
(Per cent off list for less than case or keg quantities)

	Reg. Hvy.
½-in. & smaler	35 28.5
⅝-in. & ¾-in.	29.5 22
⅞-in.-1⅛-in.	24 15
1⅛-in. & larger	13 8.5
⅜-in. & smaller	Light 35
½-in. to ⅝-in.	28.5
¾-in. to 1⅛-in.	26

STEEL STOVE BOLTS
(F.o.b. plant; per cent off list in packages)

Plain finish .... 48 & 10
Plated finishes .... 31 & 10

HEXAGON CAP SCREWS
(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ⅝-in. & smaller 42
- ¾-in. through 1 in. 34

Longer than 6 in.:
- ⅝-in. & smaller 26
- ¾-in. through 1 in. 4

SQUARE HEAD SET SCREWS
(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 38
1 in. and smaller diam. x over 6 in. 26

HEADLESS SET SCREWS
(Packaged; per cent off list)

No. 10 and smaller 35
¼-in. diam. & larger 16
N.F. thread, all diams. 10

RIVETS

F.o.b. midwestern plants
Structural ⅜-in., larger 7.85c
⅞-in. under .... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers. List to list-plus $1

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 70%, $43; 60%, $40.
Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

Diam.	Inches Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip
301	41.00	34.00
302	41.25	36.75
303	43.25	40.25
304	43.25	38.75
309	56.00	55.00
316	57.00	59.00
321	49.25	48.25
347	53.75	52.25
410	36.50	30.50
416	37.00	37.00
420	44.00	47.00
430	39.00	31.00
501	27.50	26.00
502	28.50	27.00

Bait., Types 301-347 sheet, except 303 and 309 E2
Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.
Bridgeville, Pa., bars, wire, sheets & strip U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.
Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.
Cleveland, strip A7.
Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.
Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.
Duquesne, Pa., bars U5.
Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.
Gary, Ind., sheets except Type 416 U5.
Harrison, N. J., strip and wire C18.
Massillon, O., all items, R2.
McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.
McKeesport, Pa., bars, sheets except Type 416 U5.
Middletown, O., sheets and strip except Types 302, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars U5.
Muncie, Ind., wire 1-7 quotes types 302, 304, 430.
Pittsburgh, sheets C18.
Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.
Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.
So. Chicago, Ill., bars & structurals U5.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars U4
Wallingford, Conn., strip W2 quotes 0.25c higher.
Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.
Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c; strip 64.00c W4.
Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.
Youngstown, strip except Types 303, 309, 316, 416 501 and 502 and 34.25c on Type 301 C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-35.00
Toluol, one deg. 26.00-33.00
Industrial xylol 25.00-33.50
Per ton bulk ovens
Sulphate of ammonia $32-$45
Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) 17.25

Bars Wire Structurals
31.25
31.50
34.00
53.00
44.75
49.25
37.00
41.50
25.75
26.25
31.25
26.25
14.25
15.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron .... Cents 98+% Fe, carlots, 17.00
Swedish, c.i.f. New York, in bags 8.85-9.95
Electrolytic iron:
- Annealed, 99.5% Fe, 42.50
- Unannealed 99+% Fe 36.50
- Unannealed, 99+% Fe (minus 325 mesh) 53.50

Powder Flakes 48.50
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns, $3.00-148.00
Aluminum:
- Carlots, freight allowed 29.50
- Atomized, 500 lb drums, freight allowed 32.50

Antimony 75.85
Brass, 20-ton lots 30.00-33.25
Bronze, 10-ton lots 51.25-60.00
Phosphor - Copper, 20-ton lots 50.00
Copper:
- Electrolytic 37.25
- Reduced 33.75

Lead 26.30
Magnesium 75.00-85.00
Manganese:
- Minus 100-mesh 57.00
- Minus 35 mesh 52.00
- Minus 200 mesh 62.00

Nickel unannealed 86.00
Nickel-Silver 5-ton lots 45.00
Silicon 38.50
Solder (plus cost of metal) 8.50
Stainless Steel, 302 .... $3.00
Zinc, 10-ton lots 25.00-32.50
Tungsten .... Dollars
Melting grade, 99% 60 to 200 mesh:
- 1000 lb and over 6.00
- Less than 1000 lb 6.15

98.8% minus 65 mesh:
- 1000 lb and over 4.15
- Less than 1000 lb 4.25

Molybdenum:
- 99.9% minus 200 mesh 3.24

Chromium, electrolytic 99% Cr, min. 3.50

METALLURGICAL COKE

Price net ton

BEEHIVE OVENS

Connellsvll fur. $14.50-15.00
Connellsvll fdy. 17.00-18.00
New River foundry 21.30
Wise county, foundry 15.95
Wise county, furnace 15.20

OVEN FOUNDRY COKE

Kearney, N. J. ovens, $22.75
Everett, Mass., ovens
- New England, del. *24.80

Chicago ovens 23.00
Chicago, del. 24.50
Terre Haute, ovens 22.50
Milwaukee, ovens 23.75
Indianapolis, ovens 22.75
- Chicago, del. 26.42
- Cincinnati, del. 25.85
- Detroit, del. 26.85

Ironton, O., ovens 22.50
- Cincinnati, del. 25.12

Painesville, O., ovens, 24.00
- Cleveland, del. 25.82

Erie, Pa., ovens 23.50
Birmingham, ovens 20.30
- Birmingham, del. 21.60

Philadelphia, ovens 22.70
Nevillelsland Pa. ovens 23.00
Swedeland, Pa., ovens 22.60
St. Louis, ovens
- St. Louis, del. 25.40

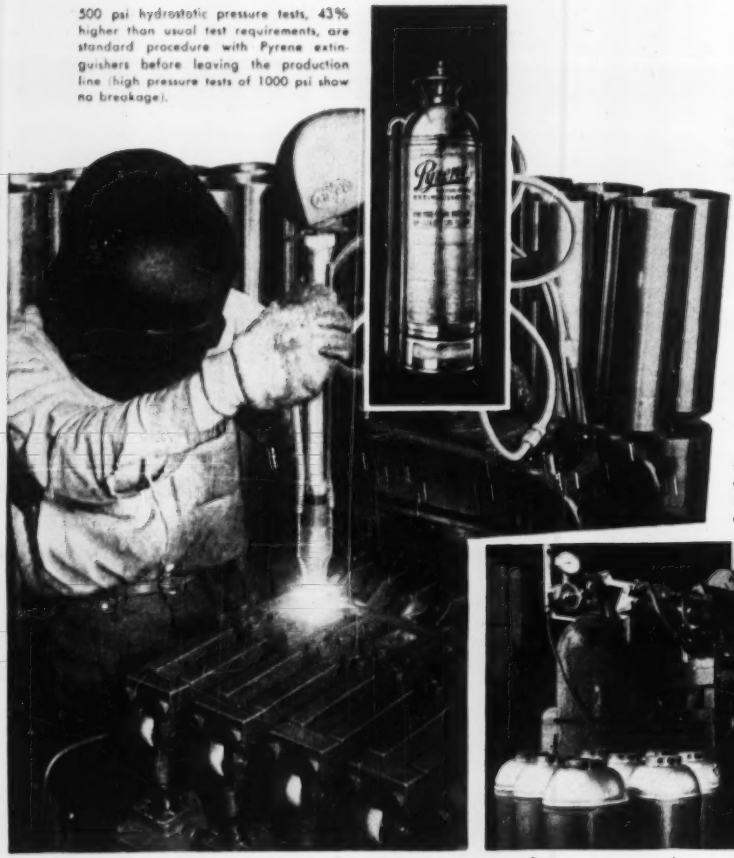
Portsmouth, O., ovens 22.50
- Cincinnati, del. 25.12

Detroit, ovens 24.00
- Detroit, del. 25.00

Buffalo, del 26.89
- Flint, del. 26.59
- Pontiac, del. 25.47
- Saginaw, del. 26.92

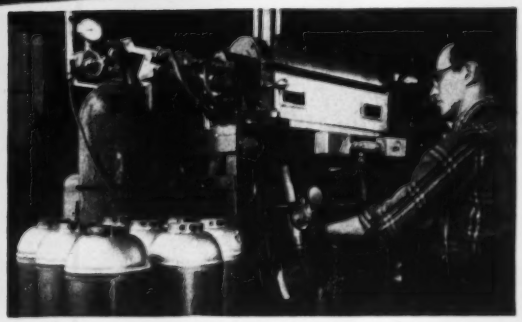
* Or within $4.15 freight zone from works.

500 psi hydrostatic pressure tests, 43% higher than usual test requirements, are standard procedure with Pyrene extinguishers before leaving the production line (high pressure tests of 1000 psi show no breakage).



Semi-automatic Heliwelding of type 301 stainless steel is a high-speed operation at the Pyrene Manufacturing Co. of Newark, N. J. Here, jig-mounted stainless steel cylinder bodies are longitudinally weld-seamed at 90" per minute.

Finger-tip controlling two No. 10 Radiograph arms, one operator simultaneously Heliwelds two 1000 psi pressure-tested end seams in 41 seconds.



Silent fireman with a 40-foot reach...

HELIWELDED PYRENE FIRE-STOPPER

Discharging an easily directed 40-foot stream, the new stainless steel gas-cartridge-operated Pyrene Water Type Fire Extinguisher eliminates two important fire protection problems... annual recharging and the danger of working with acid ... and its price is comparable to older soda-acid equipment.

Pyrene's answer for meeting the cost problem? Lighter weight equipment, stronger-made with Airco's semi-automatic Heliwelding process.

Why? Because Heliwelding, with its inert gas shield, eliminates the need for flux. No slag is formed, welds are exceptionally strong and clean. Gas shielded electrodes provide a highly concentrated arc permitting high-economy production welding with a minimum of distortion.

If you're welding thin sections of the "problem" metals, stainless steel, aluminum, on a production basis, Airco Heliwelding can help you. Find out how from your nearest Airco office. Please address Advertising Department, 60 East 42nd Street, New York 17, N. Y. for your copy of ADC-709: Heliwelding.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

AN AIR REDUCTION PRODUCT

AIRCO®

DEALERS AND OFFICES IN PRINCIPAL CITIES

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY

REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡*		Carbon	Floor
New York (city)	6.39	7.11	8.55	7.05	...	6.49	7.29	9.28	6.37	6.74	7.98
JerseyCity(c'try)	6.10	6.91	8.25	6.75	...	6.19	6.99	10.48	6.07	6.44	7.68
Boston (city)	6.40	7.18	8.65	6.70	...	6.36	7.08	10.80	6.42	6.65	7.84
Boston (c'try)	6.20	6.98	8.45	6.50	...	6.16	6.88	10.60	6.22	6.45	7.64
Phila. (city)	6.04	6.97	8.35	6.60	7.11	6.29	7.16	10.48	6.10	6.38	7.29
Phila. (c'try)	5.79	6.72	8.10	6.35	6.86	6.04	6.91	10.23	5.85	6.13	7.04
Balt. (city)	5.74	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.57
Balt. (c'try)	5.54	6.80	8.20	6.03	...	6.01	6.63	...	6.13	6.13	7.37
Norfolk, Va.	6.78	...	...	...	...	6.04	7.30	...	6.30	6.30	7.15
Richmond, Va.	5.74	6.57	8.38	6.14	...	5.91	6.59	...	6.72	6.86	8.00
Wash. (w'hse)	6.05	7.26	8.49	6.50	...	6.50	7.26	...	6.60	6.65	7.86
Buffalo (del.)	5.74	6.52	8.43	6.30	...	5.72	6.65	10.68††	6.02	6.18	7.55
Buffalo (w'hse)	5.54	6.32	8.23	6.10	...	5.52	6.45	10.48††	5.82	5.98	7.35
Pitts. (w'hse)	5.50	6.32	7.85	5.59	6.90	5.45	6.20	10.30††	5.65	5.65	6.89
Detroit (w'hse)	5.76	6.50	8.47	6.15	7.15	5.74	6.64	10.45††	6.09	6.14	7.21
Cleveland (del.)	5.74	6.52	8.16	5.85	7.14	5.81	6.60	8.91	6.15	6.02	7.39
Cleve. (w'hse)	5.54	6.32	7.96	5.65	6.94	5.61	6.40	8.71	5.95	5.82	7.19
Cincin. (w'hse)	5.79	6.03	8.24	5.72	...	5.70	6.59	10.44††	6.04	6.09	7.25
Chicago (city)	5.74	6.52	8.05	5.69	...	5.67	6.50	10.30††	5.85	5.90	7.09
Chicago (w'hse)	5.54	6.32	7.85	5.49	...	5.47	6.30	10.10††	5.65	5.70	6.89
Milwau. (city)	5.90	...	8.21	5.85	...	5.83	6.81	10.46††	6.01	6.06	7.25
Milwau. (c'try)	5.70	...	8.01	5.65	...	5.63	6.61	10.26††	5.81	5.86	7.05
St. Louis (del.)	6.02	6.80	8.33	6.56	...	5.95	6.88	10.58††	6.22	6.27	7.46
St. L. (w'hse)	5.82	6.60	8.13	6.36	...	5.75	6.68	10.38††	6.02	6.07	7.26
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
Kans.Cty(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90§	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75§	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.50	8.30§	9.50	6.60	10.65	6.45	8.35	11.50††	6.50	6.50	8.75
L. A. (w'hse)	6.30	8.10§	9.30	6.40	10.45	6.25	8.15	11.30††	6.30	6.30	8.55
Seattle-Tacoma	7.01	8.64	9.55	7.90	...	6.70	9.05	10.35	6.70	6.83	8.73
San Francisco	6.64	7.88§	8.85§	6.43	...	6.60	8.20	11.15	6.40	6.55	8.50

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gauge; †† as annealed; ‡‡ 15 gage. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ¹—500 to 1499 lb; ²—450 to 1499 lb; ³—3500 lb and over; ⁴—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	$20.00-24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)	30.00-31.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom.

Rhodesian

45% no ratio	$29.00
48% no ratio	31.50-32.00
48% 3:1 lump	50.00-51.00

Domestic—rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa.; $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244, f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c ton lots 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 0.5c to above prices. Spot, add 0.25c

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 34c per lb or metal; packed, 34.75c; ton lot 36.25c; less ton lots 38.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: 40,000 lb or more, 28c; 2000 to 39,999 lb, 30c; 250 to 1999 lb, 32c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65 - 68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed, 10.65c, ton lots 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18% C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silicon Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c, Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb. contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic Oxide: Per lb. contained Mo., f.o.b. Langeloth, Pa., $1.14, in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

NOTE: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 149, Apr. 21 issue; calcium, zirconium and briquetted alloys, page 179, Apr. 14. Refractories prices also were published on page 179, Apr. 14 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952

STEELMAKING SCRAP COMPOSITE

Apr. 24	$43.00
Apr. 17	43.00
Mar. 1952	43.00
Apr. 1951	44.00
Apr. 1947	33.94

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	42.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades	
2 No. 1 Busheling	Base
3 No. 1 Heavy Melting	$1.00
4 No. 2 Heavy Melting	1.00
5 No. 2 Bundles	1.00
6 Machine Shop Turnings	10.00
7 Mixed Borings and Short Turnings	6.00
8 Shoveling Turnings	6.00
9 No. 2 Busheling	4.00
10 Cast Iron Borings	6.00
Elec. Furnace and Fdry. Grades	
11 Billet, Bloom & Forge Crops	2.50
12 Bar Crops & Plate	5.00
13 Cast Steel	5.00
14 Punchings & Plate Scrap	2.50
15 Electric Furnace Bundles	2.00
Cut Structurals & Plate:	
16 3 feet and under	3.00
17 2 feet and under	5.00
18 1 foot and under	6.00
19 Briquetted Cast Iron Borings	Base
Foundry Steel:	
20 2 feet and under	Base
21 1 foot and under	2.00
22 Springs and Crankshafts	1.00
23 Alloy Free Turnings	3.00
24 Heavy Turnings	1.00
25 Briquetted Turnings	Base
26 No. 1 Chemical Borings	3.00
27 No. 2 Chemical Borings	4.00
28 Wrought Iron	10.00
29 Shafting	10.00
31 Odd Ties & Terne Plated Bundles	10.00

Unprepared Grades

When compressed constitutes:

32 No. 1 Bundles	6.00
33 No. 2 Bundles	8.00
34 Other than material suitable for hydraulic compression	8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces of foundries; or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or refolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls skimmings of scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2 No. 2 Heavy Melting Steel	$2.00
3 No. 2 Steel Wheel	Base
4 Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5 No. 1 Busheling	3.50
6 No. 1 Turnings	3.00
7 No. 2 Turnings, Drillings & Borings	12.00
8 No. 2 Cast Steel and uncut wheelcenters	6.00
9 Uncut Frogs, Switches	Base
10 Flues, Tubes & Pipes	8.00
11 Structural Wrought Iron and cut steel, uncut	6.00
12 Destroyed Steel Cars	8.00
13 No. 1 Sheet Scrap	9.50
14 Scrap Rails, Random Lengths	2.00
15 Rerolling Rails	7.00
Cut Rails:	
16 3 feet and under	5.00
17 2 feet and under	6.00
18 18 inches and under	8.00
19 Cast Steel, No. 1	3.00
20 Uncut Tires	2.00
21 Cut Tires	5.00
Bolsters & Side Frames:	
22 Uncut	Base
23 Cut	3.00
24 Angles, Splice Bars & Tie Plates	5.00
25 Solid Steel Axles	12.00
26 Steel Wheels, No. 3 oversize	Base
27 Steel Wheels, No. 3	5.00
28 Spring Steel	5.00
29 Couplers & Knuckles	5.00
30 Wrought Iron	8.00
31 Firebrokes	8.00
32 Boilers	6.00
33 No. 2 Sheet Scrap	13.00
34 Carsides, Doors, Car Ends, cut apart	6.00
35 Unassorted Iron & Steel	6.00
36 Unprepared scrap, not suitable for hydraulic compression	8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1 No. 1 (Cupola)	$49.00
2 No. 2 (Charging Box)	47.00
3 No. 3 (Hvy. Breakable)	45.00
4 No. 4 (Burnt Cast)	41.00
5 Cast Iron Brake Shoes	41.00
6 Stove Plate	46.00
7 Clean Auto Cast	52.00
8 Unstripped Motor Blocks	43.00
9 Wheels, No. 1	47.00
10 Malleable	55.00
11 Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.

(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3. For preparing into:

(4) Grade No. 25, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premium for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa. 53c; Buffalo, 83c; Butler, Pa., 65c.

Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.

Coatesville, Pa., 50c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 73c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 26c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, 70c.

Youngstown, 75c.

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory:	
Prep'd	33.00
Unprep'd	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	50.00

* F.O.B. shipping point.

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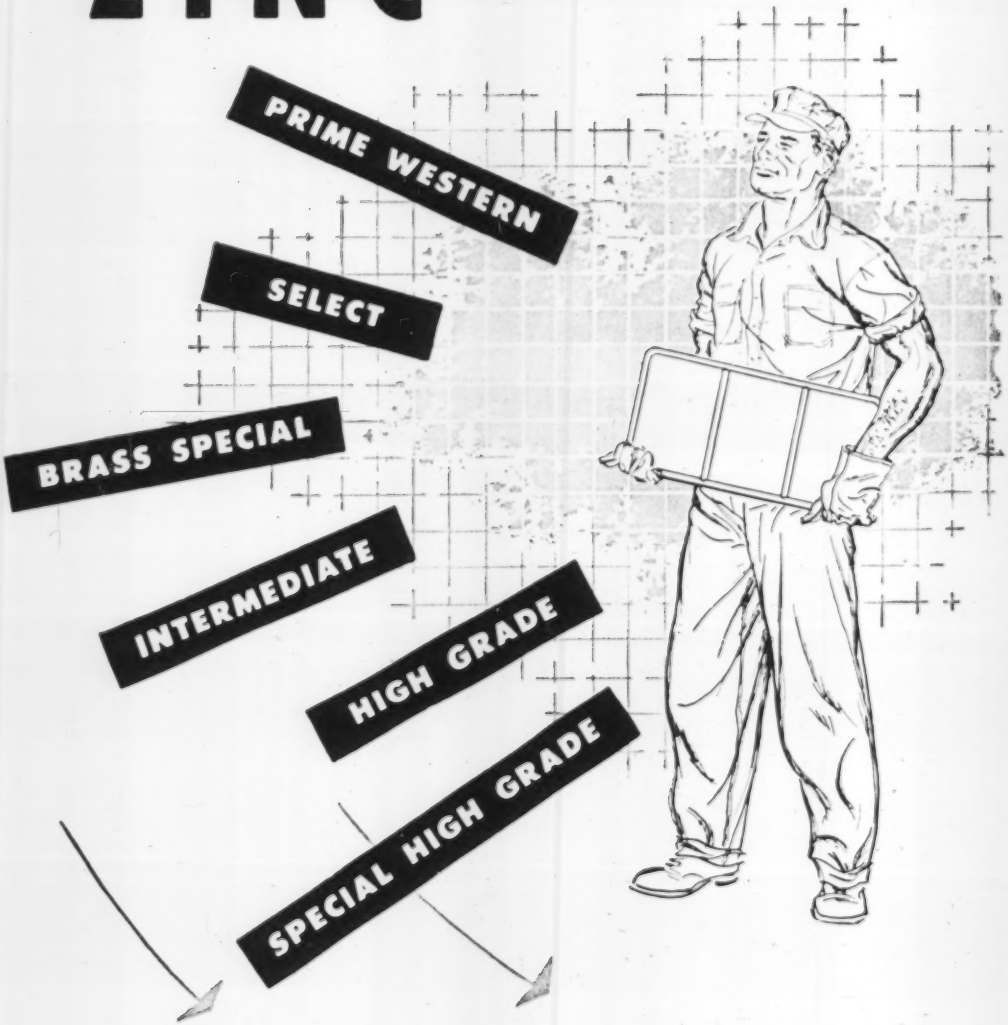

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The Metal Market

Zinc and lead prices are in a vulnerable position. After allocations cease—May will be the last—a price dip that will aid both metals competitively is likely

STIMULATING and cementing future markets for zinc is now uppermost in the minds of zinc producers. The flip-flop in supply and demand creates a present problem.

Even NPA is reaching the conclusion that there's enough of the white metal around for everyone: May allocations will be the last. The demise of M-9 is relished by all concerned.

Matter of Price—Users of zinc, now in the saddle, are making their weight felt too. They're not buying in volume and regularity; supplies in brass mills and plants of galvanizers and die casters are abnormally low. That's because they sense the price isn't going up with the present world market loosening and chances are about four to one for a drop. Ore concentrates in smelters' shops show they're playing the market short, too.

Underselling of U. S. prices by foreign suppliers of slab and ore is likely to resume. The protective tariff on zinc isn't high; it can be absorbed profitably by some when it's reimposed. The truth is that both lead and zinc are in an extremely vulnerable position pricewise when compared to other metals.

Vulnerable—Biggest stir of the two-day American Zinc Institute meeting in St. Louis was caused by Charles Pack, Doehler-Jarvis Corp., giving "The Die Caster's Viewpoint." He laid his cards on the table, telling zinc men of the inroads aluminum and magnesium are making in their biggest market.

To meet this competition, zinc producers must give solid assurance of continuing supply, said Mr. Pack. More important, they must not price their product out of the market. From the floor came hasty assertions (from C. R. Ince, St. Joseph Lead Co.; Simon D. Strauss, American Smelting & Refining Co.; and Howard Young, American Zinc Co.) that on both scores the challenge would be met.

Less Gloomy—From galvanizers came word that their market was by no means drying up, but price competition was forcing thinner zinc coatings. Brass mills expect new government specifications to bring a shift in grades of zinc employed. More of the higher grades will be used—possibly to the extent of 10 or 15 per cent—but less prime western and brass special. That suits the producers as it will help balance the product-mix demand.

That there'll be plenty of zinc on hand this year was borne out by Mr. Strauss. He predicted that world mine production of zinc (ores and concentrates) this year will top mine product consumption by smelters and other consumers for the first time since 1946. Mine production in 1952 outside the Iron Curtain is estimated at 2,418,000 short tons. Metallurgical requirements are set at 2,300,000 short tons, leaving an expected ore surplus of about 118,000 tons.

Lead Hangs Heavy

Imports will threaten lead prices too. Unsold lead is piling up in producers' hands for the first time in two years. Domestic users aren't placing orders nearly so freely; they know there's no rush.

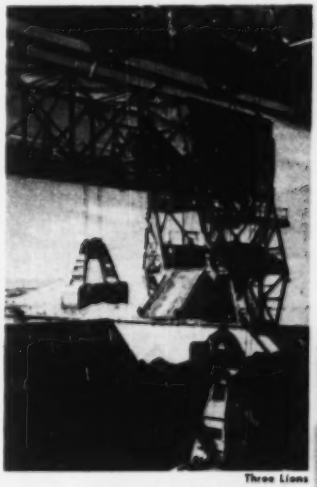
Remaining controls on lead will be lifted anytime now. The Lead Industries Association tried to spur the action at its annual meeting in Chicago last week by unanimously approving a resolution calling for immediate decontrol. Felix Wormser, St. Joseph Lead Co., president of the association, blamed government planning in action for creating a "troublesome and unnecessary shortage." He said the industry preferred unpleasant fluctuations to government stabilization.

Lead production this year will change little from 1951 levels unless the price forces marginal mines out of operation. Canada expects a 10 per cent output rise; tax regulations there encourage exploration and development.

Consumption is another matter. Storage battery makers (they consume 32 per cent of all lead) surprisingly expect a 4 per cent rise in use this year. A big Ordnance buying program is the answer. Tetraethyl lead use is slated to rise through 1954. All other major users expected to either maintain the status quo or suffer slight setbacks this year.

Odds Shortened By Alcan

Modified export plan offered by Aluminum Co. of Canada stands a much better chance of approval, but the odds still don't favor it. The new offer involves smaller quantities (200,000 short tons yearly) and a shorter time (1955 through 1958). Alcan lowered its guarantee requirement to 450,000 tons, with a maximum of 100,000 tons per year to be bought by the government.



Three Lions

Copper Atop the Andes

Once the world's largest supplier of copper, the U. S. today must import extensively to meet its needs. Here copper ore is processed at Chuquicamata, Chile, 10,000 feet high in the Andes mountains. The fields are operated electrically from a power plant at the port city of Tocopilla, 100 miles away. After ore is blasted loose, it is moved to large tanks for leaching the valuable copper salts from the ore. Photo shows clamshell clearing the tank of the waste residue at Anaconda's new sulphide plant

Nonferrous Briefs

Aluminum ingot price boost of 1-2c a pound would be necessary if a wage package similar to that imposed on the steel industry were forced on Alcoa, says I. W. Wilson, Alcoa president . . . National Lead Co. bought a majority interest in the government-owned nickel plant at Nicaro, Cuba . . . Ceilings went on nickel anodes and platinum last week . . . Magma Copper Co. wants a $111 million RFC loan to develop it's Pinal county, Arizona, ore body.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c; East St. Louis, high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c; St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.80c; grade 2, 18.60c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99.99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%; base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "NX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $202-$206 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55, del.; special or patented shapes $2.80.

Cobalt: 97.99% $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53, cold-drawn 38.78; yellow brass free cutting 32.63; commercial bronze 95% 41.20; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.28; commercial bronze, 90% 43.79; red brass, 85% 43.09.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass, 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 28.54c; 30,000 lb lots, 28.67; l.c.l., 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.60; l.c.l., 31.10. Magnet wire del., 15,000 lb or more, 34.50; l.c.l., 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths of Flat Sheet Diameters, In.	Inc. Base*	Coiled Sheet Base	Coiled Sheet Circle Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) of distance across flats	Round 2017-T4	178-T4	Hexagonal R-317-T4	178-T4
0.125	52.0	...	...	...
0.156-0.0188	44.0	...	...	...
0.219-0.313	41.5	...	...	...
0.375	40.0	46.0	48.0	...
0.406	40.0	...	...	...
0.438	40.0	46.0	48.0	...
0.469	40.0	...	...	...
0.500	40.0	46.0	48.0	...
0.531	40.0	...	...	...
0.563	40.00	...	...	45.0
0.594	40.0	...	...	...
0.625	40.0	43.5	45.0	...
0.688	40.0	...	45.0	...
0.750-1.000	39.0	41.0	42.5	...
1.063	39.0	...	41.0	...
1.125-1.500	37.5	39.5	...	41.0
1.563	37.0	...	...	...
1.625	36.5	...	...	39.5
1.688-2.000	36.5	...	...	...

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50c-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, 6.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
1952								
Apr. 1-24	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Mar. 1-31	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Mar. Avg.	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Feb. Avg.	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. Avg.	24.50	18.80	19.50	109.404	19.00	50.00	56.50	88.00
1951								
Dec. Avg.	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16

NOTE: Copper, Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 28.00c; 5 tons and over 28.50c; 1 to 5 tons, 29.00c; less than 1 ton 29.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point; freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.60c; 700 to 1900 lb, 66c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.375; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c; 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Sannmous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	19.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material. Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy brass solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment) Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes): drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap; Copper-free solids, 10.00; dural type, 9.00. Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

Sheets, Strip . . .

Sheet and Strip Prices, Page 147 & 148

Cleveland—Tonnage lost in the recent brief shutdown of operations attending the strike threat will add to the mills' carryover into third quarter. Prior to the labor difficulty producers had been hopeful of getting current on shipments by midyear. The overflow on cold-rolled sheets is now estimated to take a substantial part of July output, while the hot-rolled carryover will not be fully cared for until well into August in some cases. All the mills now are accepting orders for full third quarter. Some had been taking tonnage only for July. Full booking for the period is anticipated by the larger mills, but the smaller, premium-priced interests expect continued difficulty in booking all the tonnage they can handle despite the recent slight pickup in automotive and domestic appliance requirements. Pending higher delivered prices as result of the freight rate increase, effective May 2, have not stimulated buying for stockpile, chiefly for the reason new orders cannot possibly be shipped until after the freight rate effective date. Prices applying on steel deliveries are those in effect at time of shipment regardless of when tonnage was ordered.

Boston—Sheet order bookings fill July mill schedules, and August space is nearly taken up, but overall pressure for third quarter tonnage is easiest since advent of controls. Military requirements for flat-rolled are maintained, but consumer durable goods producers are slow to take advantage of heavier allotments. Weakest is cold-rolled strip. Slitting to size by some converters, virtually giving warehouse service, coupled with sharp competition for orders has softened prices. L. E. Zurbach Co. is low on 610 tons, cartridge clip steel, mostly high carbon, for Springfield armory.

New York—The advance in freight rates, effective May 2, has not resulted in any particular pressure from consumers to get tonnage delivered before the higher rates apply. Buyers will have to absorb the freight increase, but they realize production cycles will proceed without regard to traffic increases and that any added pressure upon producers to speed deliveries will be of little avail.

The new rate from Sparrows Point to New York will be 48.30c per 100 pounds in 40,000-pound carlots, plus the 3 per cent federal tax, against 45.78c currently; from Pittsburgh, 71.3c, against 67.58c and from Buffalo, 66.7c, against 63.22c.

Straight chrome grades of sheets continue in easy supply, with deliveries ranging about five to eight weeks. Competition for stainless steel business is so strong mills are equalizing freight where necessary. This is about the only steel product on which freight equalization is being practiced.

Philadelphia — Easing restrictions on steel for consumer durable goods in third quarter is bolstering demand for sheets. However, there is still a lag which may be ascribed to the fact stocks in some consumer lines are in excess of demand. This is particularly noticeable here in stoves.

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Minneapolis Pittsburgh Springfield, Mass.
Hartford, Conn.

On the other hand, there has been something of a spurt in commercial refrigerator and deep freeze units. Effective May 2, rail rates from Sparrows Point, Md., to this city will be 33.35c per 100 pounds in 40,000 pound carlots, against 31.61c; from Conshohocken, Pa., 10.35c against 9.81c; from Pittsburgh, 60.1c against 58.86c.

Pittsburgh—Stiffened demand for cold-rolled sheets is noted here reflecting increased demand from the automotive industry. Domestic appliance producers requirements are still down and appear likely to remain so for balance of this quarter. Carryover to third quarter will be approximately two weeks' production—half of which was caused by the recent work stoppage. All books for third quarter will be filled with the exception of electrical silicon sheets which currently are running at about 90 per cent of capacity. Galvanized demand is stiff here, hot-rolled is strong, long ternes are holding up well, and strip is reported marginal on some mills.

Chicago—Some of the recent easing in cold-rolled sheets seems disappearing. Mill output for third quarter will be fully committed if present indications are borne out. Tightening stems from NPA relaxation of restrictions on civilian hard goods.

Birmingham—Recent slowdown in production of sheets further tightened supplies in this area.

Los Angeles—Cold-rolled strip requirements of office equipment and appliance manufacturers are increasing.

Plates . . .

Plate Prices, Page 147

Philadelphia — Strip plate is in fairly easy supply but sheared plate is scarce, especially heavier gages. Producers anticipate good business well into the third quarter. Effective May 2, the rail rate from Sparrows Point, Md., to this city will be 33.35c per 100 pounds in 40,000 pound carlots, against 31.61c; from Claymont, Del., and Conshohocken, Pa., 10.35c against 9.81c; from Coatesville, Pa., 16.95c against 16.36c; from Harrisburg, Pa., 37.95c against 35.97c; and from Pittsburgh 60.1c against 58.86c. To these rates tax must be added.

Boston—Availability of more narrow light plates is not solving production-cost problems with numerous fabricators. While price advantages involving extras range up to $8 per ton, additional welding costs and design changes offset these. Heavy, wide sheared plates are difficult to obtain. Some mills are not booking tonnage beyond July.

New York — Plate demand continues brisk, particularly for the heavier gages. Producers are not only solidly booked on the thicker plates throughout this quarter but throughout most of the third quarter as well. Exceptions are certain mills which are quoting extra high premiums, or have not opened their books for all of the period. New freight rates, effective May 2, are 48.30c per 100 pounds from Sparrows Point, Md., against the current rate of 45.78c; 36.80c from Conshohocken, Pa., against 34.88c; 39.10c from Coatesville, Pa., against 37.06c; 37.95c from Claymont, Del., against 35.97c; and 71.3c from Pittsburgh, against 67.58c.

Pittsburgh—Demand is extremely heavy for plates with district mills having no trouble maintaining full rolling schedules. Production is back to normal following the work stoppage and seizure of the industry. Ten days' production was lost. Second quarter order books are filled and it is expected third quarter books will be likewise shortly.

Seattle—Small plate fabricators are handicapped in bidding on larger projects by inadequate steel allocations. Penstocks and tunnels in several federal dam projects in this area will require large tonnages of plates.

Structural Shapes . . .

Structural Shape Prices, Page 147

Washington—Elimination of controls over structural steel at earliest time consistent with safety of the defense program was recommended last week by the Structural Steel Fabricators Industry Advisory Committee to NPA. Removal of CMP control, it was held, is warranted in view of a rapidly improving supply-demand situation. Increase in order backlogs the past few months was cited. It also was recommended that NPA amend its regulations to provide for automatic revalidation of controlled materials tickets which cannot be cashed in a given quarter. Currently, structural steel is being produced at a rate of approximately 1,400,000 tons per quarter, some 900,000 tons going for construction and the remainder into production. Industry representatives have been seeking extension of inventory limitations from 45 days to 120 or 145 days. NPA officials indicate individual requests for extension will be granted.

Boston—Structural mills are unable to book all the tonnage wanted for July. Easing in wide flanged shapes is slower than anticipated. Allotments are heavier, but getting tonnage from the mills promises to be a problem for some months yet. Shop inventories lack balance. Estimates are in on 25,000 tons, Fitzgerald Expressway, Boston. Mt. Vernon Bridge Co., low on contract D-2, superstructure, 4000 tons, quoted 21.00c and 23.00c carbon steel, floor system and bents respectively, and 25.00c on silicon steel for bents.

New York—Increasing amount of commercial construction and bridge work is being figured. Awards at the moment, however, are light. Effective May 2, freight rates on shapes from Bethlehem to New York will be 33.35c per 100 pounds, against 31.61c at present, and from Phoenixville, Pa., 37.95c, against 35.97c.

Philadelphia — Structural inquiry is sluggish. In this immediate district no projects involving 100 tons or more have been brought out within the past two weeks. Activity is far below general trade expectations. State bridge work is fairly well sustained. One sizable defense tonnage has been placed, namely, 4000 tons for the first section of the projected Army cast armor plant at Birdsboro,

Pa. Effective May 2, the new rail rate on shapes from Bethlehem, Pa., to this city will be 23c per 100 pounds in 40,000 pound carlots, against 21.8c, and from Phoenixville, Pa., 13.8c against 13.08c. The rates are before tax.

Pittsburgh — Demand here for shapes is excessive due to increased CMP tickets recently authorized by NPA. Second quarter books are filled and mills expect third quarter books will be within three weeks. Mills report all shapes are in tight supply in this district. With sharply increased allotments for third quarter for roads, schools, commercial projects and hospitals, mills see excellent business continuing into fourth quarter or longer.

Seattle—Several large dams involving substantial tonnages of shapes are pending. Sellers are seeking third quarter business. Wide flange beams are in tight supply but overall supply of shapes is improved.

Tin Plate . . .

Tin Plate Prices, Page 148

Pittsburgh—Mills expect NPA to shortly decontrol certain secondary tin mill items such as misprints, tin and terne waste wasters, tin plate strips and cuttings, black plate rejects, black plate wasters and black plate waste wasters. Black plate is expected to be freed within the limits of M-25 and use of 0.25-pound electrolytic plate for items such as paint cans permitted.

Steel Bars . . .

Bar Prices, Page 147

New York—Hot carbon bar sellers who had opened their books for July only, now are accepting tonnage for August and September. However, they are curtailing allotments for the latter two months so as to offset tonnage lost by the recent disruption of operations at the time of the strike threat.

Some sellers of electric furnace hot alloy bars can book tonnage for July shipment. Books are filled for that month on open-hearth alloy bars. One large producer of cold-finished alloys is quoting August on non-furnace treated material and September on treated.

On May 2 the freight rate from Johnstown, Pa., to New York will be increased to 62.1c per 100 pounds in 40,000 pound carlots from the current 58.86c rate; Pittsburgh, 71.3c from 67.58c; and Buffalo, 66.7c from 63.22c (assuming the New York commission approves a corresponding increase in intrastate rates by that time).

Philadelphia—Hot carbon bars are the most scarce of all major steel products. Strong and diversified demand continues pressing on the bar mills. Effective May 2, the rail rate from Johnstown, Pa., to this point will be 55.2c per 100 pounds in 40,000 pound carlots, against 52.32c; from Pittsburgh, 60.1c against 58.86c; from Buffalo, 66.7c against 63.22c.

Boston — Forge shops are buying heavily. Military orders are large at mill level. Considerable tonnage is scheduled for nearby rolling, including die-rolled stock. Producers

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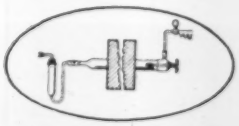

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are slow to book new carbon orders beyond July, but on alloys are filling for third quarter, and through the remainder of the year on aircraft stock. Low carbon resulphurized grades are tight with most consumers turning down alternate specifications. Growing demand for rifle barrel blanks is stimulating alloy bar business.

Pittsburgh—Little change in the tight supply conditions prevailing in the bar market is seen by district producers. Automotive interests, trying to place additional second quarter orders find the going difficult. They are reported seeking rolling time for conversion of their own semifinished steel. Third quarter books are just about filled and mills expect to show approximately a week's carryover from second quarter.

Cleveland—No easing in bar supply is in prospect over coming months with pressure of defense requirements still rising. Forge shops are getting a little larger tonnage of billets and bars than some time back but they could use more. Books generally have been opened for third quarter but with the carryover from second quarter expected to be larger than indicated some time back because of the recent loss of production, the mills are inclined to book forward orders cautiously.

Wire . . .

Wire Prices, Page 149

Boston—Third quarter orders for wire mill products are slow. There are openings for June space on numerous items.

Los Angeles—Supplies of nails and wire mesh are adequate but trade observers expect tightening supply as building gathers momentum.

Tubular Goods . . .

Tubular Goods Prices, Page 151

Seattle—Several government installations in Alaska call for substantial tonnages of cast iron pipe.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 147

Boston—Flurry in concrete reinforcing bars centers largely in bridges and, in some degree, housing and schools. Bars for bridge substructures, 1000 tons, have been bought while estimates are in on 3065 tons, mostly deck work and approaches. Fitzgerald Expressway, Boston. Contractors are quoting an average of 10.00c per pound for bars in place on most projects.

Chicago—Not all interests see an easing in reinforcing bars, either supply or demand-wise. Contractors are more competitive seeking work, but steel requirements are as difficult to meet as ever. Evidence of this is the maintenance of demand for rail steel bars.

Seattle—Largest reinforcing steel contract this year to date, 18,500 tons for the Chief Joseph dam, was placed last week by the Columbia River Contractors.

Pig Iron . . .

Pig Iron Prices, Page 146

Chicago—Pig iron supply is in fair balance with demand. Melting rate is well below capacity. Of the district's 42 blast furnaces, 40 are active. On Apr. 6 U. S. Steel Co. took out its South Works No. 10 furnace for relining but on Apr. 18 restored No. 3 stack. Youngstown Sheet & Tube Co. idled its No. 3 stack at South Chicago on Apr. 4 for relining.

Boston—Small shipments of southern and Tonawanda iron contribute to foundry supplies while the Mystic blast furnace is down. Foundrymen show little concern as to a possible supply pinch before the Mystic stack resumes production. Inventories are in fair shape.

New York—Effective May 2, pig iron freight rates from Bethlehem to New York increase from $3.5861 to $3.7835, and Bethlehem to Newark, N. J., from $2.8667 to $3.0245. Demand for iron is active although not pressing as most district consumers are operating at only a fair rate.

New York—Pig iron production in March amounted to 6,241,286 tons against 5,722,673 in February, according to the American Iron & Steel Institute. Production in first quarter totaled 17,943,186 tons. Ferromanganese and spiegel output in the first three months was 181,013 tons, bringing total blast furnace production in the period to 18,124,199 tons. Ferromanganese and spiegel output in March was 58,720 tons, down slightly more than 2000 tons from February.

Philadelphia—There is still demand for all the pig iron produced, but, except for basic, there is no over-demand. Effective May 2, the rail rate from Bethlehem, Pa., to this city on pig iron is $2.7485 per gross ton, against $2.6051; from Steelton, Pa., $3.5535 against $3.3681; from Swedeland, Pa., $1.6560 against $1.5696. These rates are subject to the 3 per cent federal tax.

Pittsburgh—No appreciable increase in orders is noted here since consumers have been allowed by the NPA to double their iron inventories. Demand from district foundries remains static. Some pickup is expected soon with improved building schedules. All stacks in this area are in blast with the exception of one at Bethlehem's Johnstown, Pa. plant and three at U. S. Steel's Duquesne, Donora and Edgar Thomson works.

Cleveland—Merchant iron sellers are under less pressure for tonnage with foundry operations spotty, especially among the smaller shops. However, no yard piling of iron is reported, demand being sufficiently large to absorb current production. The recent loss of output due to furnace suspensions during the period of labor disruption did not spur protective covering by consumers despite the fact pig iron inventory limits have been raised to 60 days. They had been 30 heretofore. Higher freight rates, effective May 2, which will be reflected in increased delivered prices, has not stimulated demand to any extent.

Youngstown—Republic Steel Corp.'s Trumbull Cliffs blast furnace at Warren, O., has been blown out for enlarging and relining. The furnace

hearth will be enlarged from 27 to 28 feet in diameter, raising daily rated capacity to 1470 tons. The stack will be down about 30 days and makes two of 25 blast furnaces in this area down for relining.

Birmingham — Slowing down in foundry activity has removed some of the pressure for pig iron. But merchant iron sellers are not yet having difficulty disposing of all their tonnage.

Scrap . . .

Scrap Prices, Page 154

Cleveland—Tone of the scrap market is firm, especially on the steelmaking grades. While material is flowing steadily to the mills, volume is not what it was prior to the recent steel labor trouble, possibly reflecting the cleaning out of dealers' yards before the shutdown of operations. Another factor for slower movement is the apparent reluctance of some scrap generators to release tonnage in the face of a probable steel price increase shortly, which, it is expected, will be reflected in a similar markup in scrap. The mills are taking all of the material offered them. In fact, some of them are pressing the market for tonnage and there is no sign here of price easiness except on the cast grades. Even the latter appear somewhat stronger than recently except for motor blocks which are reportedly moving about $2 under ceiling in the form of freight absorption. Good quality cast, such as No. 1 cupola, is not too plentiful and easily finds takers. Electric furnace grades of scrap are definitely firmer following a pickup in demand reflecting resumption of operations at several furnaces that had temporarily suspended production. Mills in this district estimate the increase in freight rates which go into effect May 2 will add an average of about 75 cents per ton to their scrap costs.

Pittsburgh—Consumers' inventories are better than they have been for many months. Average stocks of carbon grades appear larger than a three-weeks' supply and give every indication of improving daily. Good open-hearth material is not plentiful but electric furnace scrap is in better supply. Little cast scrap is moving, being a drug on the market with sales reported $3 and more below ceilings. Generators of industrial scrap are expected to seek price advances on their material if steel prices are substantially increased.

Boston—Cast grades are dull and weak. No. 1 cupola cast is selling off $8 to $9 under ceiling, shipping point, and not much tonnage is moving at $40 Boston. No. 1 machinery cast is also weak, around $45 shipping point. Motor block volume is at a standstill. Consumers of steel scrap are holding to specifications. One has halted buying of No. 2 steel.

New York—Scrap supply is easier. Demand for open-hearth grades is not as pressing as a few weeks ago. Cast grades remain ample, with cupola cast prices off $1 or so.

Philadelphia—Open-hearth scrap is coming out in fair volume. Consumers are below normal for this season, but they are adequate in most cases. Recent lag in low phos

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scrap demand has faded somewhat, due particularly to buying by an eastern Pennsylvania consumer who usually relies on crop ends from its own mills. Cupola cast prices have eased to a spread of $47-$48 delivered, off about $1. Unstripped motor blocks are steady around $40 delivered.

Detroit—There are no indications here that prices on No. 2 heavy melting and No. 2 bundles are about to crack although the mills are more selective as regards quality. Stocks of steelmaking scrap are building up, but rejections are frequent. Foundry operators are ignoring most offerings of anything less than top grade material, but prices are holding steady at about $2 to $5 per ton under the ceilings on cast grades.

Chicago—Flood conditions in Missouri and Mississippi river areas are disrupting the flow of scrap into Chicago but consumers are suffering no hardship. Steel plant inventories range from 30 days upward. Cast grades are in excess supply with foundries buying sparingly. Blast furnace items are moving fairly well but on an irregular basis.

St. Louis—Slight easing of melting steel supplies continues. Mills are adding moderately to stocks and are trimming springboards they will pay. Maximum springboard paid now is $2 a ton on the average. Dealers predict the prevailing price by May 1 will be ceiling, delivered. Mills have a comfortable 30 to 45 day stockpile and are avoiding allocations. Shipments are fair except from flood-hit areas.

Cast market is worsening. Dealers complain they can't get $45 for No. 1 foundry cast, $4 under ceiling. Stripped motor blocks, ceilinged at $43 shipping point, are going at $35 delivered. Stove plate with a $46 ceiling is selling at $39 delivered.

Birmingham—Relatively comfortable supplies of heavy melting steel are available in this district. Weakness is marked in most cast grades of scrap.

Los Angeles—Mill rejections are increasing, indicating stockpiles are higher. Movement of cast scrap is limited. Foundries are well stocked.

San Francisco—One marginal mill in this area is reducing its buying prices for all grades of open-hearth scrap $5 per ton across the board, indicating it is overstocked—at least, bundlewise. Other mills, however, are taking as much scrap as is offered, although their inventories are rising. This is the seasonal peak for scrap collections. There is little movement in cast iron scrap. Smaller foundries are taking truckloads of cupola No. 1 cast at prices ranging between $40 and $42 a ton.

Seattle—Steel scrap receipts are running less than consumption due to temporary suspension of shipments as result of the recent steel labor difficulty. Bundles are a drug on the local market and are being diverted to Geneva, Utah. Large buyers are willing to accept some cast iron but are refusing to pay high freight rates from distant points, ranging from $12 to $16 per ton. Foundry operations are steady. Cast iron scrap ranges from $35 to $44, delivered plant. Electric furnace scrap commands ceiling levels.

Warehouse . . .

Warehouse Prices, Page 153

Washington—Schedule 3 to M-6A, just issued by NPA and effective immediately, prohibits steel distributors from selling nickel-bearing stainless steel to any consumer during any one month in excess of 500 pounds, unless the consumer has an authorized controlled material (ACM) order. Customers must certify that nickel-bearing stainless brought from the warehouse will be used only for purposes permitted in NPA order M-80. Heretofore, distributors were permitted to sell any quantity without requiring ACM orders.

Cleveland—Warehouse cost changes in March, based on tonnnage receipts that month, are reflected in minor revisions in price schedules as of Apr. 16. Under the warehouse pricing formula in CPR 98, distributors base their prices on monthly average costs, including mill base prices they pay for steel and transportation charges, plus normal markup. As a result, quotations of the separate warehouses differ slightly although usually the lowest figures quoted in a district are accepted as representative of the going market. Some distributors have established prices on most products sufficiently below OPS ceilings to avoid monthly changes in their schedules despite fluctuating costs. The higher freight rates, which become effective May 2, will not be mirrored in warehouse prices until mid-June for the reason under CPR 98 prices as of mid-month are based on costs in the preceding calendar month. Currently warehouse stocks are improving with a better flow of tonnage from the mills. Inventories of most products, however, continue unbalanced. Demand is stronger seasonally, but occasional price shading is noted, chiefly on secondary products.

Detroit—Price adjustments were necessary on a few products Apr. 16, but more important, at least temporarily, are distress offerings of flat-rolled products below generally recognized market levels. Heavy plate

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is more readily obtainable, although in the ½-in. thinckness demand continues strong. Cold-finished bars are scarce in all sizes.

Pittsburgh — District operators complain of out-of-balance inventories. Mill shipments are holding up well for most distributors but they are having trouble getting bars, large structurals and wide and heavy plates. Customer demand is improving but because of unbalanced stocks, operators cannot give all-around service. Flat-rolled and type 430 stainless are in best supply here. On certain sheet transactions reports persist of $20 per ton price slashes being made.

Philadelphia — Warehouse business in the month now closing is on a parity with that in March. Demand continues pressing for bars and heavy plates, and is fairly strong for shapes. Business in sheets and strip is lagging.

Birmingham — Warehouses report an easier supply condition but they are moving steel practically as fast as it is available.

Los Angeles—Key to decreased demand for steel from aircraft plants is the decline in overtime worked by aircraft manufacturers as result of the stretch-out of aircraft production. Stocks of flat-rolled in warehouse are reported larger.

San Francisco—Distributors' business still is good and prices are firm at ceiling levels. A few are reported in the trade where price concessions are made, but these are isolated and cast no permanent reflection on the generally firm price structure.

Seattle — Monthly price adjustments were made last week by local warehouses in line with CPR 98. No significant changes in schedules are reported. Distributors' order volume is increasing seasonally. Structural shapes will be in tight supply into third quarter. Plates continue scarce, as also are hot-rolled and galvanized sheets. Cold-rolled sheets are plentiful. Warehouse inventories generally are unbalanced.

Iron Ore . . .

Iron Ore Prices, Page 153

Cleveland—Iron ore shipments to date this season total 3,154,406 gross tons, increase of 254,466 tons over this time last year. Shipments in the latest week were 1,843,582 tons against 1,966,502 in the corresponding week of 1951.

Consumption of Lake Superior ore in March totaled 8,022,214 tons, of which 7,665,687 tons were by U.S. furnaces and 356,527 tons by Canadian stacks. In February 7,229,076 tons were used and in March a year ago, 7,371,688 tons. In first quarter, consumption amounted to 22,778,672 tons against 21,133,437 in the first three months last year.

Total stocks at furnaces and on Lake Erie docks Apr. 1 were 21,451,105 tons. This compares with 29,207,005 on Mar. 1, and with 17,335,362 on Apr. 1, 1951.

There were 188 furnaces in blast on Apr. 1, 178 in the U.S. and 10 in Canada. This compares with 189 on Mar. 1 and 184 a year ago. Eight furnaces were idle Apr. 1, seven in the U.S. and 1 in Canada. On Mar. 1 six were idle, and a year ago there were 10 inactive.

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Toronto, Ont.—Production of primary iron and steel shapes in Canada in January was record-breaking at 437,287 net tons, comparing with 375,867 in December and 403,906 tons in January, 1951.

Primary shapes shipped for sale in January amounted to 266,425 net tons, including 252,795 tons of carbon and 13,630 tons of alloy steel. For December shipments totaled 247,559 tons.

Shipments for sale in January included 8412 tons of semifinished shapes; 11,235 tons of structurals; 21,241 tons of plates; 22,676 tons of rails; 7685 tons of tie plates and track material; 49,417 tons of hot rolled bars; 16,573 tons of pipes and tubes; 28,179 tons of wire rods; 28,875 tons of black sheets; 10,715 tons of galvanized sheets; 11,173 tons of castings and 45,561 of other rolled products.

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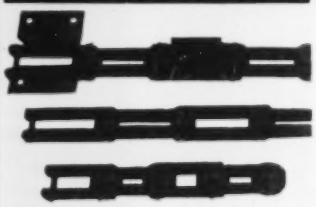

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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6000 tons, state bridge over Hackensack river in northern New Jersey, to American Bridge Division, United States Steel Co., Pittsburgh.

4000 tons, first section, Army cast armor plant, Birdsboro, Pa., to Harris Structural Steel Co., New York.

125 tons, galvanized transmission towers, Tacoma, Wash., light department, to Bethlehem Pacific Coast Steel Corp., low $53,267.

STRUCTURAL STEEL PENDING

7200 tons, steel superstructure, North to Oliver street, Fitzgerald Expressway, Boston, contract H-2, Bethlehem Steel Co. low on combined bid $4,301,143. If split into two contracts Bethlehem is low on H-2A, North to Commerce street, 3600 tons, $2,125,944.20, contract H-2B, Commerce to Oliver street, 3960 tons, Harris Structural Steel Co., New York, low, $2,151,968. bids Apr. 22, Department of Public Works, Boston.

4900 tons, contract D-2, superstructure, Haymarket Square to North street, Fitzgerald Expressway, Boston; Mount Vernon Bridge Co., Mt. Vernon, O., low, $2,296,905.50; Bethlehem Steel Co., Bethlehem, Pa., $2,322,177.90.

1530 tons, municipal bridge in Patapsco Development, Baltimore, bids May 7; also requires 550 tons of reinforcing steel, 77 tons of low alloy steel and 3434 linear feet of metal rail.

900 tons, paper pulp mill, Doctorton, Ga., for Ebasco Services, New York City, bids closed Apr. 21.

675 tons, state bridge, Lehigh county, Pennsylvania; C. W. Good, Lancaster, Pa., low on general contract.

250 tons, North Metropolitan relief tunnel and shaft C, Boston-Chelsea-Winthrop Division; bids May 1, Metropolitan District Commission, Boston.

240 tons, state bridge, Salem county, New Jersey, bids May 20.

150 tons, machine shop, Eklutna power project, Alaska; bids to Denver, May 20.

145 tons, bridge, Damariscotta river, Lincoln-Damariscotta, Me.; bids Apr. 30, Augusta, Me.

110 tons, Skokomish flats transmission towers, Tacoma, Wash., light department; to Bethlehem Pacific Coast Steel Corp., Seattle, low $37,853.

Unstated, steel frame barracks and other items, Kodiak, Alaska, naval base; bids in.

Unstated, 358 trash rack sections and beam, McNary dam; Valley Iron Works, Yakima, Wash., low $528,464, to U. S. Engineer, Walla Walla, Wash.

Unstated, 54 stop logs, 36 trash racks, etc., McNary dam pumphouse; bids to U. S. Engineer, Walla Walla, Wash., May 28.

Unstated, 40-ton gantry crane, Big Cliff dam, bids to U. S. Engineer, Portland, Oreg., May 15.

REINFORCING BARS . . .

REINFORCING BARS PLACED

18,500 tons, Chief Joseph dam, Washington state, to Steel Constructors, Portland, Oreg.; Columbia River Contractors, general contract.

3500 tons, Box Canyon dam, Idaho, reported to San Jose Steel Co., San Jose, Calif.

385 tons, substructure, bridge, Connecticut river, West Springfield, Mass., to Northern Steel Co., Boston; Daniel O'Connell's Sons Co., Holyoke, Mass., general contractor.

345 tons, including 125 tons mesh, Meshanticut traffic interchange, Cranston-Warwick, R.I., to Bethlehem Steel Co., Bethlehem, Pa.; M. A. Gammino Construction Co., Providence, R. I., general contractor.

150 tons, two Washington state highway jobs, to Bethlehem Pacific Coast Steel Corp., Seattle.

150 tons, Park Manor apartments, Seattle, to Northwest Steel Rolling Mills, Inc., Seattle.

100 tons, Mount St. Washington, high school, to Northwest Steel Rolling Mills, Inc., Seattle.

100 tons, including miscellaneous steel, housing project, Hartford road, Providence, R. I., to Plantations Steel Co., Providence, R. I.; E. Turgeon Construction Co., Providence, general contractor.

100 tons or more, housing project, Trumbull avenue, Bridgeport, Conn., to Bethlehem Steel Co., New Haven; E. & F. Construction Co., Bridgeport, general contractor; miscellaneous structural steel to Grossman Steel Stair Corp., New York.

REINFORCING BARS PENDING

2065 tons, deckwork paving and approaches, Fitzgerald Expressway, sections C-3, D-3 and H-3, Charles river bridge to Oliver street, Boston, V. Barletta Co., Roslindale, Mass., low, $2,935,218. Bids Apr. 22, Department of Public Works, Boston.

450 tons, Eklutna power plant and machine shop; bids to Denver May 20.

250 tons, Washington state highway bridges, Lewis county etc.; bids to Olympia, May 6.

180 tons, two-span rigid frame bridge, Hopkinton, R. I.; bids in.

135 tons, state bridges, Manchester-Wenham, Mass.; M. DeMatteo Construction Co., Quincy, Mass., low.

110 tons, Washington state, Spokane county highway girder bridge; general contract to H. Hagman, Cashmere, low $175,766.

100 tons, rigid frame bridge, Richmond, R. I.; bids in.

Unstated, 3-story addition to state reformatory cell block, Monroe, Wash.; bids to Olympia, May 14.

Unstated, 40 magazines, storehouses, etc., Bangor, Wash., depot; bids to U. S. Navy, Seattle, May 5.

PLATES . . .

PLATES PLACED

200 tons, including shapes, ten 110-ft. cargo barges for Seattle Port of Embarkation, to Reliable Welding Works, Olympia, Wash.

PLATES PENDING

Unstated, water tunnel and system expansion, $1 million; plans in preparation, bids soon to Everett, Wash.

PIPE . . .

CAST IRON PIPE PLACED

300 tons, 16 and 12-in. for Seattle system expansion, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

250 tons, system improvements; bids in to Grants Pass, Oreg., Apr. 18.

Unstated, supply and distribution system, $189,000 project; Wrangell, Alaska; bids to Alaska Public Works, Juneau, May 21.

Unstated, 17,000 feet, 18-in. supply mains, Kodiak, Alaska, Navy base; Drake-Puget Sound, Seattle, joint low bid.

RAILS, CARS . . .

RAILROAD CARS PLACED

Seaboard Air Line, 400 fifty-ton low side gondolas, to its Portsmouth, Va., shops.

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Seneca Plans New Strip Mill

Seneca Steel Service Inc., Buffalo, announced plans for an $800,000 expansion program covering a new specialty steel strip mill. Construction of the new mill will start in a few months, the new building costing about $200,000 and equipment about $600,000. The mill will be used for reducing steel strips further for specialty strips. It will contain 19,000 square feet of floor space.

Wagner Boosts Anode Output

Wagner Bros. Inc., Detroit, announces completion of a new wing to its plant which will house additional anode production facilities. It will more than triple existing production of anodes. Henry Tiedeman is works manager.

Buffalo Pipe Adds Cupolas

Buffalo Pipe & Foundry Corp., Tonawanda, N. Y., added two new cupolas at a cost of $100,000. Mechanical equipment for the handling of big ladles has been installed in the iron pipe foundry and an apartment building has been converted into a modern office building.

Illinois Gear To Expand

Illinois Gear & Machine Co., Chicago, purchased about 200,000 square feet of additional land, adjacent to its main office and works on North Natchez avenue. An existing building on the property will be occupied by a pattern shop and will be used for pattern storage. The balance of the land will be improved to expand the company's machine shops, heat treating and parking facilities.

Trusler Gets New Assignment

Pittsburgh Coke & Chemical Co., Pittsburgh, appointed H. F. Trusler Jr. as technical sales representative for its synthetic base coatings. He will be responsible for directing and co-ordinating sales, production, technical service and development activities of synthetic coatings.

James Coulter Machine Co.

Recent sales of Coastal Machine Works, successor to Automatic Machine Co., Bridgeport, Conn., is in no way connected with James Coulter Machine Co., also located in Bridgeport. The James Coulter Machine Co., manufacturer of thread milling machines, automatic threading lathes and many special machine tools, is still doing business at its plant located at 629 Railroad Ave., Bridgeport.

Fentron Plans Addition

Fentron Steel Works, Seattle, plans construction of an addition to its plant at 2801 Marker St.

ACF Expansion Progresses

The $1 million improvement and equipment program at the Buffalo plant of American Car & Foundry Co. is about 80 per cent complete. About 75 per cent of the expenditure is going for new equipment which will be used in production of a new type demolition bomb.

Altoona Plant Opening Nears

SKF Industries Inc., Philadelphia, is preparing to begin production in its new plant, No. 6, at Altoona, Pa. The firm is completing major changes in the plant which will produce finished bearings.

Milne Opens Sales Office

A. Milne & Co., New York, tool steel distributor, opened a sales office at 915 Fisher Bldg., Detroit 2. The office is under the management of W. T. Nagorsen.

Seattle Chain Renamed

Corporate name of Seattle Chain & Mfg. Co. was changed to Round Seattle Chain Corp. The company is located at 6921 E. Marginal Way, with branches in Portland, Oreg., and Bellingham, Wash.

Cleveland Firm Names Agent

Electric Products Co., Cleveland, appointed Robert A. Young & Co., Glendale, Calif., as its representative in Arizona and Southern California. Young will handle the company's industrial lines of motor-generators, frequency changers, motors and generators.

Foster Wheeler Shifts Plans

Foster Wheeler Corp., New York, reportedly has abandoned previous plans to erect a new $3.5 million plant in Dansville, N. Y., and instead will locate the new plant in Wilkes-Barre, Pa.

Eastern Stainless Expanding

Eastern Stainless Steel Corp., Baltimore, is installing an additional electric arc melting furnace, which, when placed in operation this summer, will more than

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RESULTS: Normal atmospheric pressure maintained, facilitating exhausting of heavy gases; improved comfort; healthier working conditions; increased worker efficiency; improved morale, better production records!

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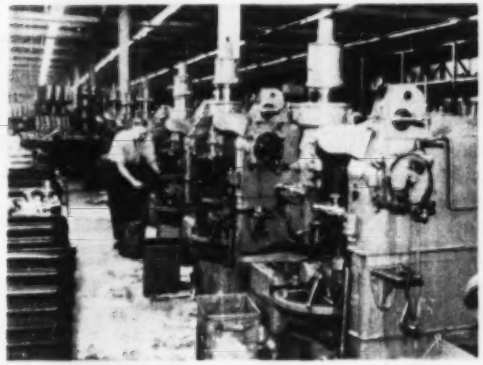

Fairfield Geared to Public Interest

More than 2000 persons saw a factory in full operation when Fairfield Mfg. Co., Lafayette, Ind., held open house at its new $2.5-million gear plant. Ground was broken for the plant less than 12 months ago, and complete operations began early this year. One of the chief advantages of the plant is a large increase in space available for work in process, which will result in faster processing and greater total output of automatic, agricultural and industrial gears

double the company's present ingot capacity.

Roller Smith To Expand

Roller Smith Corp., Bethlehem, Pa., will open a new plant in the Carbondale Industries Inc. building, Simpson, Pa. Roller Smith manufactures precision electrical equipment and plans to use about 90,000 square feet of floor space in its new location.

Bede Appoints Distributor

Bede Industrial Products Inc., Cleveland, appointed Mutual Electric Co., New York, as distributor of its paint heaters in the five boroughs of New York city.

Parker Sells Valve Business

Republic Mfg. Co., Cleveland, acquired the industrial and aircraft valve lines created and manufactured by Parker Appliance Co., that city. Republic offers a catalog giving engineering data and illustrations of these valves, ranging in size from ⅛ to 1 inch. They are made in brass, aluminum alloy, steel and stainless steel.

Bowser Enlarges Facilities

Bowser Technical Refrigeration Division, Bowser Inc., Terryville, Conn., opened its expanded facilities for construction of flight simulation chambers. This will add about 5000 square feet of floor space to Bowser's manufacturing facilities.

Binks Opens Warehouse

Binks Mfg. Co., Chicago, maker of professional spray finishing equipment, opened a branch sales office and warehouse at 1209 Levee St., Dallas. George Cook is branch manager while E. A. Preston serves the Dallas territory as sales engineer. Jobber sales throughout the Southwest are handled by Hersig-Frazier Co., Dallas.

Columbia Plans Branch Plant

Columbia Container Corp., Baltimore, manufacturer of corrugated containers and die cut specialties, is erecting a branch plant at 2240 Annapolis Ave., that city. The company is erecting a similar plant at Norfolk, Va. James E. Glose is president.

Texas Headquarters Opened

Automatic Screw Machine Products Co., Chicago, opened its Texas headquarters, Seaport Steel Nut Co., at Houston. Richard Voggenthaler is manager of the company's western distribution center.

Ward Leonard Moves Branch

Ward Leonard Electric Co., Mt. Vernon, N. Y., moved its Los Angeles branch office and warehouse to larger quarters at 1605 E. Olympic Blvd. The Los Angeles branch carries stocks of resistors, dimmers, rheostats, relays and controls. It is managed by H. S. Eales.

Rock Bit Firm Names Agents

Drill Bit & Tool Division, Mackintosh-Hemphill Co., Pittsburgh, appointed the following as distributors of its disposable rock bits for mining, quarrying construction and other heavy industrial operations: Allied Equipment Inc., Miami, Fla.; Austin Powder Co., Cleveland; Guyan Machinery Co., Logan, W. Va.; Mine & Supply Co., Birmingham; Schroeder Bros.,

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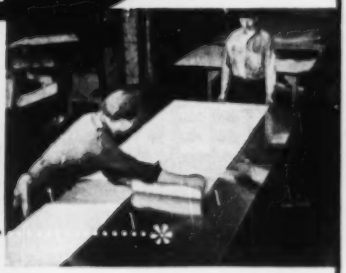

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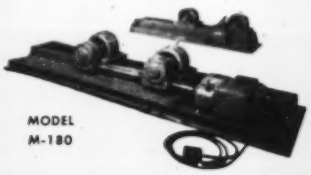

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MIT To Dedicate Laboratory

A metals processing laboratory at Massachusetts Institute of Technology will be dedicated June 3. The dedication program will be followed on June 4-5 by a technical conference on metal cutting which will feature speakers of national reputation in the metal cutting field.

Ferro To Buy Wel-Met Co.

Plans are being completed by Ferro Corp., Cleveland, for purchase of 100 per cent interest in Wel-Met Co. of Kent, O., and Salem, Ind. Previously, negotiations had been started to acquire a 50 per cent interest in Wel-Met, manufacturer of powdered metal parts, but finalization of the present action will make the company a wholly owned subsidiary of Ferro.

Supply House Changes Name

Don F. Johnson & Co. Inc., Buffalo, industrial supply house, 50 Pearl St., changed its name to Empire Industrial Supply Corp. The company is considering establishment of a branch in Erie, Pa.

Chicago Firm Offers Presses

Sales Service Machine Tool Co., St. Paul, appointed Neff Kohlbusch & Bissell Inc., Chicago, as exclusive distributor of its power presses in Illinois, Iowa and Wisconsin.

Hough Sells Sweeper Line

Meili - Blumberg Corp., New Holstein, Wis., completed negotiations with Frank G. Hough Co. for acquisition of its line of tractor sweepers. Meili-Blumberg will continue the manufacture of all such sweepers under the M-B trademark.

Allis-Chalmers Names Agent

Mercury Hardware Co., El Monte, Calif., was named a distributor for Texrope drive equipment in the San Gabriel valley, Los Angeles county, by Allis-Chalmers Mfg. Co., Milwaukee.

Opens Brush Plant in East

Pittsburgh Plate Glass Co., Pittsburgh, opened a plant at 3201 Frederick Ave., Baltimore, for the manufacture of industrial brushes. It will provide additional research, development and production facilities for the company's expanding power-driven brush operations.

Plant Opening Set for July

Westinghouse Electric Co., Air-Arms Division, will place its new 400,000 square foot plant in Baltimore into operation late in July. The plant will produce for the Navy and Air Force automatic computers to direct gun and rocket fire, radar and auto-pilots for fighter planes and guided missiles; also complete airborne armament systems.

Bloom Names Western Agent

Bloom Engineering Co. Inc., Pittsburgh, appointed Heat & Control Inc., San Francisco, as its representative in the West Coast area. Bloom makes fuel burners and allied combustion equipment for steel mill and industrial furnaces.

Newnam Foundry Damaged

Property of Newnam Foundry Inc. in Kendallville, Ind., was severely damaged by an explosion and fire. Loss is estimated at several hundred thousand dollars.

A. O. Smith Moves Unit

Manufacturing of welding equipment by A. O. Smith Corp., Milwaukee, was moved into a building at 3716 W. Wisconsin Ave., that city.

Murray Builds Addition

D. J. Murray Mfg. Co., Wausau, Wis., is building a 37,000 square foot addition to its present plant. Completion is scheduled for September. In addition to a line of specialized heavy-duty equipment for pulp and paper mills, this company manufactures "grid" unit heaters, blast coils, and radiation; grease traps, power dam gates and gate hoists.

Holes in the Head

Men and machines combine to mass-produce giant 3800-horsepower engines at the Ford engine plant in Chicago. This Footburt automatic drill and other special-purpose tools working in tandem perform 60 separate machining drilling and counter-boring operations on a cylinder head, but it still takes the skill of the inspector to check for any mechanical errors

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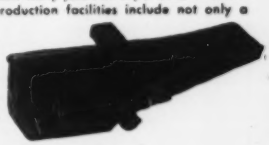

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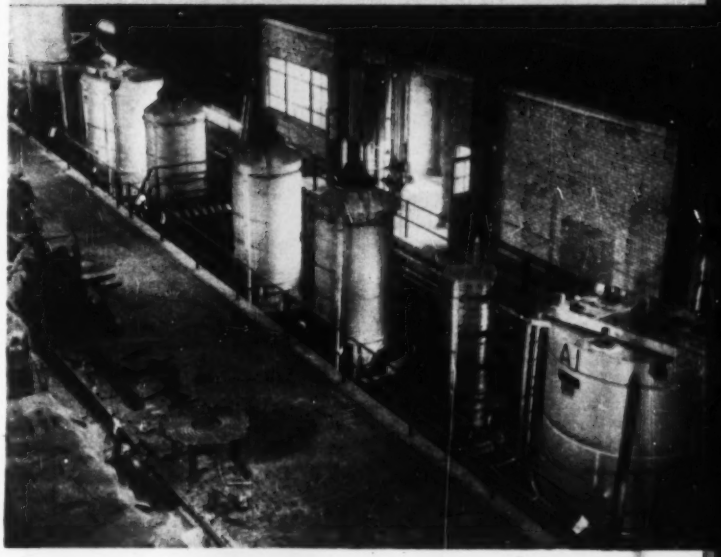
WILSON *Single stack, portable base convection annealing furnaces*

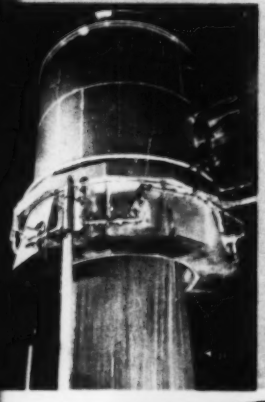
WILSON Single Stack, Portable Base Annealing Furnaces have many advantages, a few of which are shown in the pictures below.

These advantages are the use of light cranes, faster turnover, higher heat input per stack, and production doubled as compared to multiple-stack furnaces.

TYPICAL INSTALLATION OF SINGLE STACK FURNACES



QUICK HANDLING



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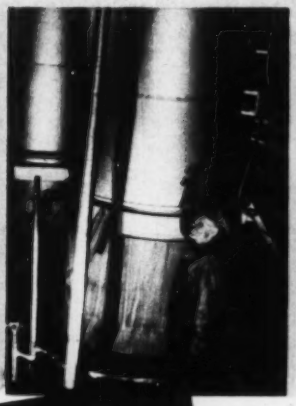


ONE INNER COVER MOVEMENT

MAXIMUM LOADING

Lee Wilson **ENGINEERING** *Co., Inc.*

20005 WEST LAKE ROAD • CLEVELAND, OHIO
Telephone ED-1-6600

BELL TYPE FURNACES ★ RADIANT TUBE HEATING ★ ANNEALING PROCESSES

New straightener eliminates guides with unique roll arrangement

...gets trouble-free operation with TIMKEN® bearings

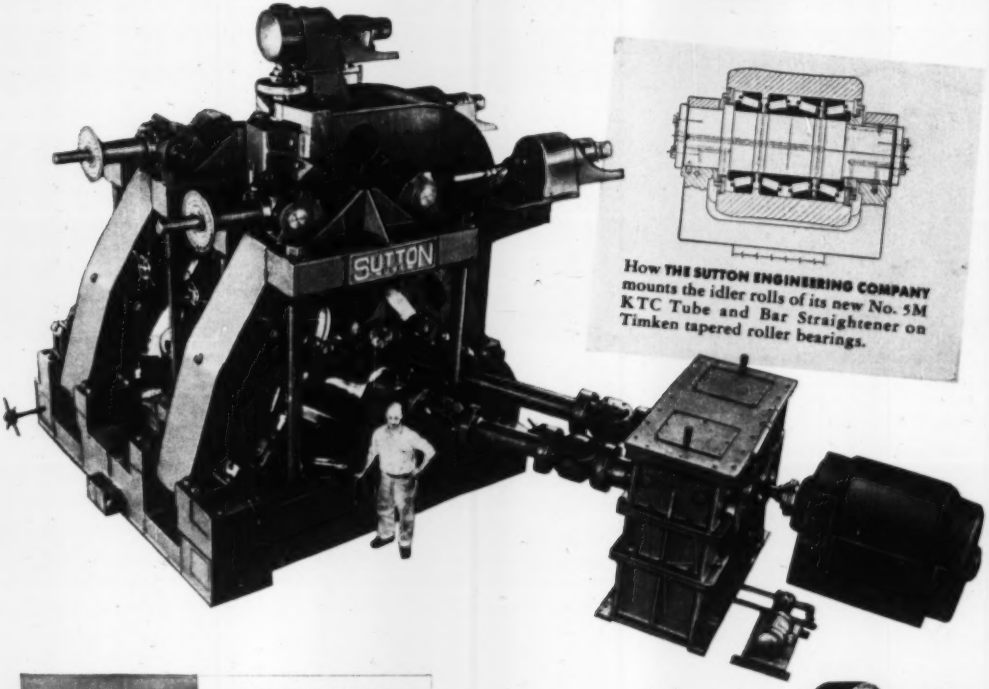
THIS new Sutton No. 5M KTC Tube and Bar Straightener has a unique roll arrangement that eliminates the use of all guides, confines the bar or tube to the pass line throughout the straightening operation. Positive feeding and uniform straightening are assured. It will straighten tubes up to 16½" O. D. and bars up to 9" O. D. To help keep the unit on the job with minimum time-out for maintenance and repairs, Sutton uses a total of 43 Timken® tapered roller bearings in the driven rolls, idler rolls, drive unit and universal joints.

The Timken bearings in this new straightener have load capacity to spare, due to line contact between the rollers and races. Because of tapered construction Timken bearings take both radial and thrust loads, hold rolls and shafts in proper alignment, reduce wear on moving parts.

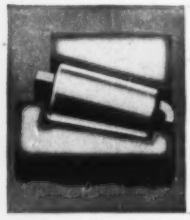
Sutton has found that closures are more effective because Timken bearings keep housing and shaft concentric. Dirt and moisture are kept out—lubricant is kept in. Maintenance and lubrication time are cut to a minimum.

No other bearing can give you *all* the advantages you get with Timken tapered roller bearings. Be sure you specify them for all the equipment you build or buy. Look for the trademark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **THE SUTTON ENGINEERING COMPANY** mounts the idler rolls of its new No. 5M KTC Tube and Bar Straightener on Timken tapered roller bearings.



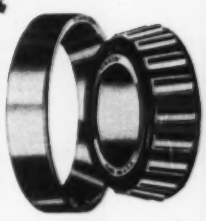
GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL — AND THRUST — LOADS OR ANY COMBINATION